The Electrical Industry's Weekly Magazine

September 29, 1958

Electrical World

Price 50 Cents

A McGraw-Hill Publication

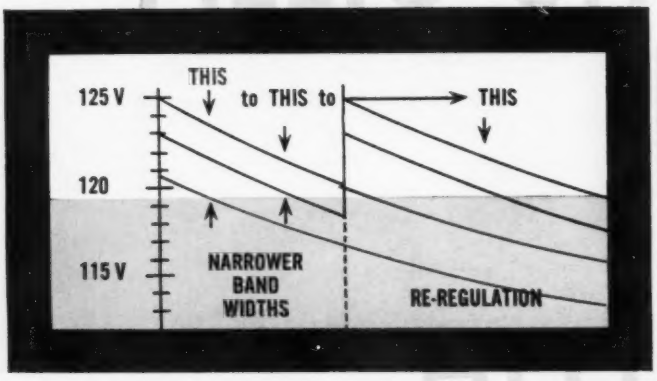
9,000-ft. oil-filled cables cross Champlain to link two states . . . . . p 52

World Power Conference . . . . . p 54

Atoms-for-Peace Meeting

E B POWER
UNIVERSITY MICROFILMS I
313 N 1 ST
ANN ARBOR MICH
GS W

LOADS DOWN?



Use this simple way to increase revenue

Narrow band widths

Re-regulation

Lower cost regulators

It's elementary — yet the revenue-producing potentialities of engineered regulation are only beginning to be capitalized. A 1-volt increase on feeders means $1 per customer per year increased revenue. With cost of regulation reduced as much as 50%, immediate profits are possible.

Here's what can be done on many feeders:

1. **Use Narrow Band Widths** — Two volts or less. Adjust regulator settings to keep voltage at the maximum.
2. **Re-Regulate Voltage** out on a feeder to bring even larger returns and improved customer satisfaction.
3. **Use Lower Cost Regulators**—New three-phase distribution regulators provide 30% saving. Utilize *Vari-Amp* for additional savings. Proper use or elimination of transformer taps adds a 5% saving.

Talk it over with an Allis-Chalmers engineer. Contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Get new technical article on economics of regulator application

Originators of 5/8% Step Regulators

ALLIS-CHALMERS

A-5798

Electrical World

Vol. 150, No. 13 SEPTEMBER 29, 1958

Published for 84 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

In This Week's Issue

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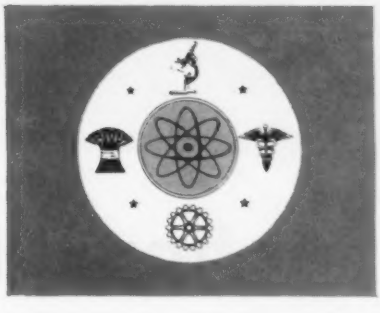

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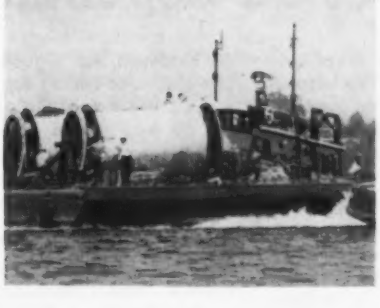

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CURRENT EVENTS

System Acquisitions Face Balloting

N. J. Co-op, towns in Oregon, Ohio study proposals for buying or selling power facilities; other proposals on the fire. p 46

MANAGEMENT NEWSLETTER

"The Little Old Man and A Little Old Plan"

NRECA Gen. Mgr. Clyde T. Ellis outlines legislative demands to regional groups. Here is most of his text. . . . . p 87

MEETING REPORTS

Hydro Stressed At World Power Conference

Toronto meeting hears plans for hydro and other power resources. Large dam group weighs added height, flyash. . p 54

2,200 Papers Give World Atom Picture

Atoms-for-peace meeting hears U. S., USSR favor enriched fuel, Britain and France back natural uranium reactors. . . . p 58

TRANSMISSION

115-KV Cables Layed Under Champlain

Four 9,000-ft oil-filled cables will carry power across narrows, linking Vermont to St. Lawrence project. . . . . p 52

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12kv giant goes under. San Diego Gas & Electric installed this 3,900-foot submarine cable across San Diego Bay in a fast and trouble-free operation. The new 12kv, 3/c, 500,000 CM cable is 4½ inches in diameter with Okolite rubber insulation, copper shielding tapes and steel armor.

Cable laying time: half an hour flat!

Okolite used for pre-tested dependability

The problem was to obtain maximum dependability in the new submarine cable laid under San Diego Bay to handle increased power needs in the busy Coronado area. In submarine cable, of course, dependability is doubly important with the rough service cable gets and the complicated and expensive operation required to lay a cable or remove it in case of trouble.

To insure this dependability, engineers from San Diego Gas and Electric chose pre-tested Okolite-insulated cable . . . and took advantage of three sound standards for evaluating anticipated cable service:

1. Time—High-voltage Okolite-insulated cables have a service record of more than 30 years . . . on land as well as in tough, underwater services, where a case of trouble can run into thousands of dollars.

2. Engineering—Okonite engineers' know-how pays off in every stage of cable purchase and installation: from designing the best construction possible to speeding installation, as in San Diego's case, with Okonite-designed reel frames, lifting beams and other cable-handling equipment.

3. Inch-by-Inch Inspection—Okonite now provides built-in life insurance for every strip-insulated, high-voltage cable through the use of its exclusive development, the "Gooding Test Train." This electronic testing equipment, which scans every inch of the cable, can pick out the most minute imperfection—impossible to detect by any standard test method—that might shorten cable life after it's placed in service.

These are three good reasons for *you* to specify Okolite for *your* vital high-voltage circuits. Whatever your cable needs, when you talk to Okonite, you get unprejudiced recommendations because Okonite, and *only* Okonite, makes cable by all four insulating methods: strip . . . dip . . . extrusion . . . taping. The Okonite Company, Passaic, New Jersey.

where there's electrical power . . . there's **OKONITE CABLE**

3479

Modernization Is An Eternal Process

Modern tools, techniques and equipment have had a lot to do with the savings in fuel, in operating costs, and in maintenance that has brought the industry's operating ratio down from 52% to 44% since 1948.

This trend will not continue unaided. The economic need to cut investment and operating costs cannot be expected to moderate in 1959. On the contrary there is plenty of evidence that costs and prices will move sharply upward as utilities approach a new decade of expansion.

Such an environment puts a premium on modernization; on keeping system facilities, techniques, and equipment completely up to date and ahead of need. This is the best and only way to insure that future loads will be served well and at minimum cost.

It is to this need that Electrical World will address its program of special reports on electric power system modernization beginning next month. We will present five consecutive weekly reports that will document today's need to modernize generation, transmission, distribution and utility service functions. Each will demonstrate the opportunities that exist for savings through modernization and present the new tools, techniques, and equipment available to offset obsolescence trends.

The first report "Modernizing Generation to Cut Power Cost" will appear in next week's issue.

Fischer Black

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Postmaster . . . Please send form 3579 to Electrical World, 330 W. 42nd St., New York 36, N. Y.

NOW Pennsylvania ups network transformer capacity to 2500 kva

for new 30-story Office Building

2 BROADWAY, NEW YORK CITY

To satisfy the power demands of the spacious, fully air-conditioned office building to be known as "2 Broadway," Consolidated Edison Company of New York specified a higher-than-ever capacity in network transformers. Six three-phase, 2500-kva Pennsylvania Network Transformers are among the eight being used in this record-setting installation, which provides 265/460Y-volt service from 13750Δ-volt feeders. There are four oil-filled units for sidewalk vaults, and two askarel-filled units for atop the thirty-story structure.

A Pennsylvania Innovation

The units all feature Corrugated Cooling—a Pennsylvania innovation of several years back that has stimulated industry-wide changes in network transformer design.

On Pennsylvania Corrugated-Cooled Network Transformers, conventional tubes and radiators are replaced by radiating chambers that resemble corrugations in the tank walls. The result is a tank with straight, smooth, vertical surfaces—a tank that is easy to clean and easy to paint, even from above the transformer.

Protection Against Corrosion

Low-alloy, high-strength, corrosion-resistant steel is used for the tank, cover, and bottom of vault-type transformers—and also for the radiating chambers of subway-type units. Coupled with the exceptional ease of maintenance and inspection made possible by Corrugated Cooling, this provides highly effective protection against corrosion.

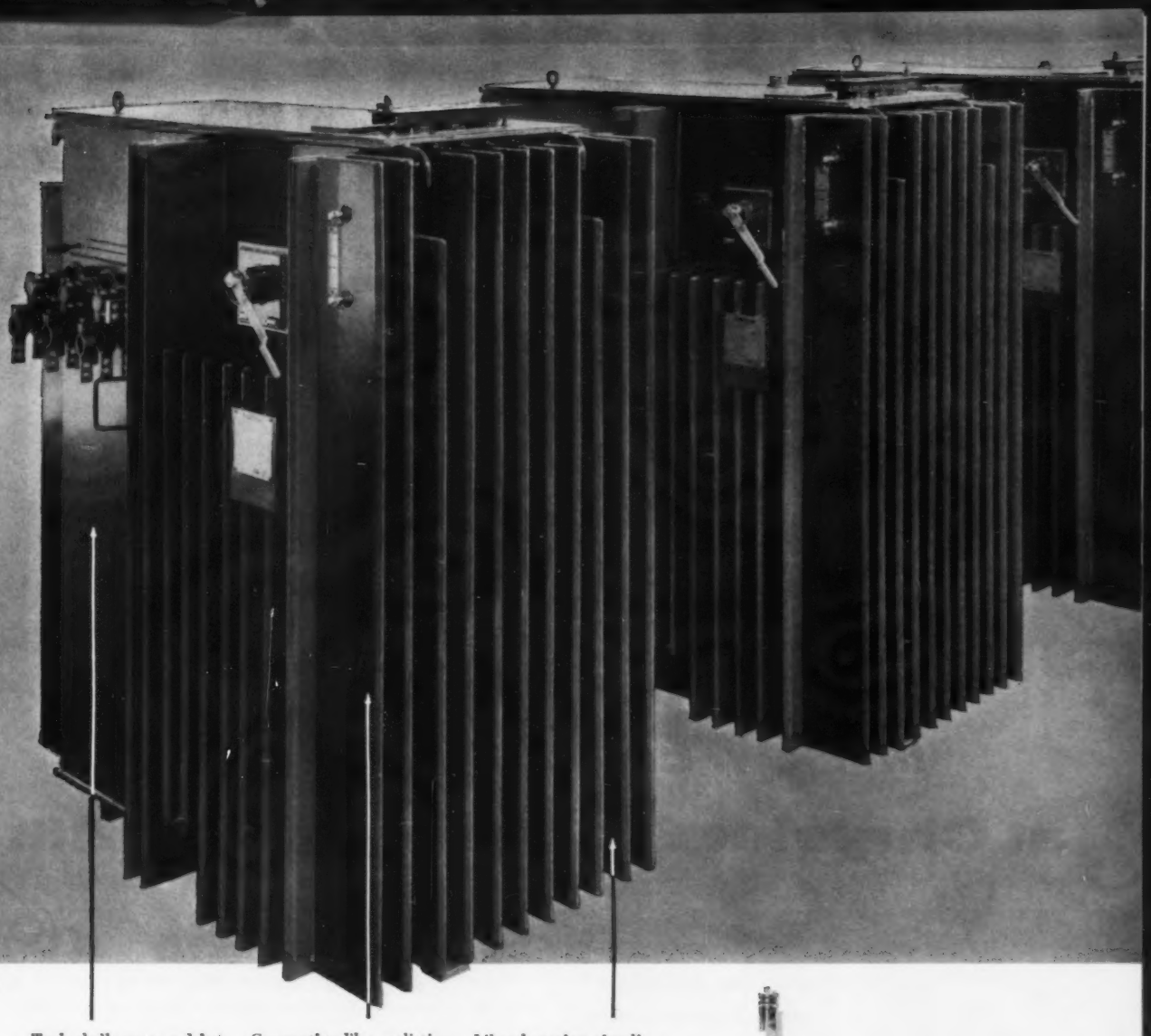
Rigid Space Requirements

In addition to the 2500-kva capacity, special requirements for the 2 Broadway installation included limiting dimensions in all three directions. It is a testimony to the effectiveness of Pennsylvania Transformer's network design that all of these special requirements could be met without any alteration in the electrical and mechanical transformer details.

No matter what type of network transformer your system requires—vault-type or subway-type, suspension-mounted or pedestal-mounted—it will pay you to investigate Pennsylvania Corrugated-Cooled Network Transformers. Contact Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pennsylvania.

CORRUGATED COOLING

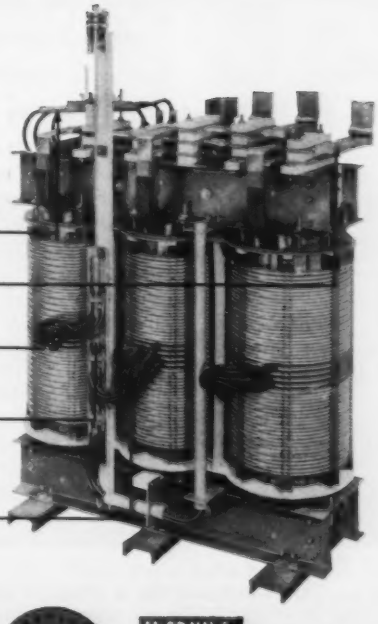
PENNSYLVANIA POWER



Tank shell, cover and bottom are made of low-alloy, high-strength, corrosion-resistant steel—used also for radiating chambers of subway units.

Corrugation-like radiating chambers replace hard-to-clean radiators and tubes. There are no ledges or crevices on which corrosive materials might collect.

Liberal spacing of radiating chambers facilitates maintenance. Transformer is easy to clean and paint, even from above.



High voltage leads are rigidly supported in insulating tubing.

Low voltage bus bars are interleaved to keep copper losses to a minimum. Bars are supported between maple blocks and insulating pads.

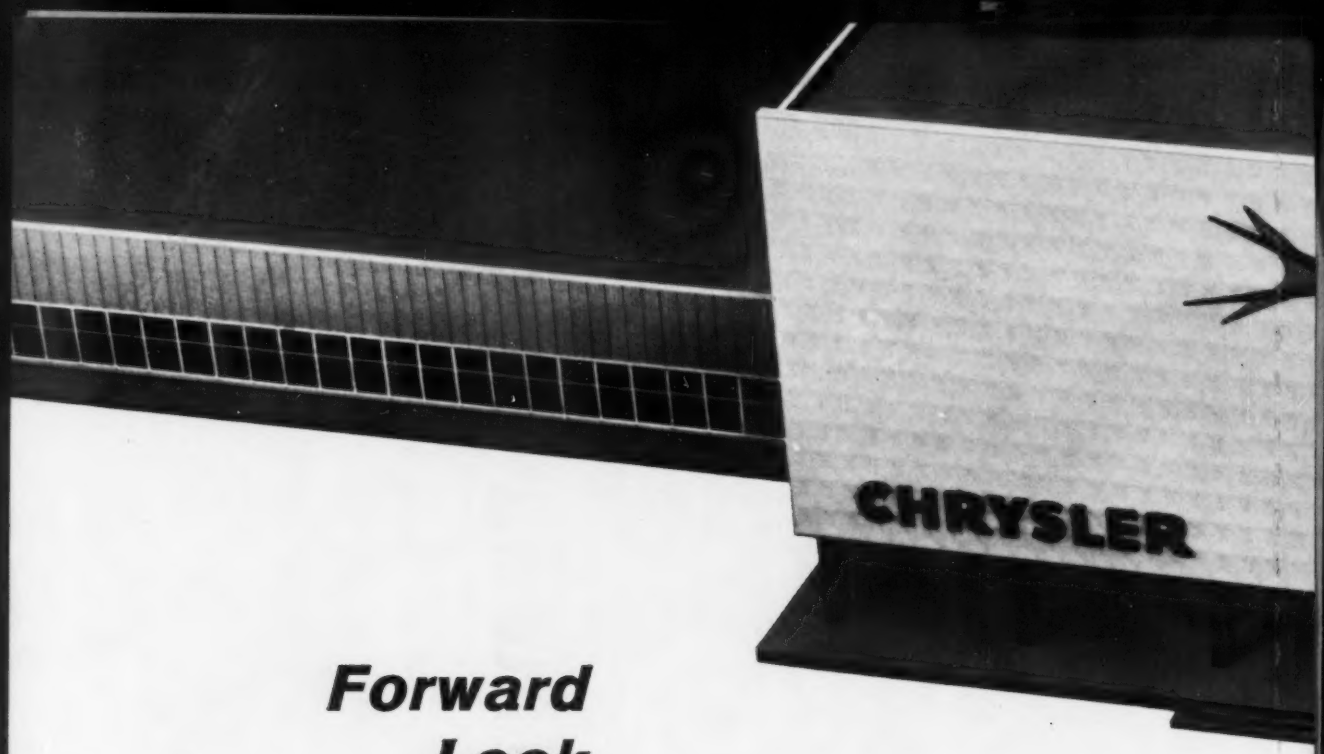
Taps are arranged to assure electrical and mechanical balance in the high voltage windings and to minimize the impedance variation over the entire tap range.

Rotary no-load tap changer cannot hang up between contacts. Entire tap changer is housed in a half tube of Pennsylite® to assure adequate vertical insulation phase-to-phase and phase-to-ground.

Pancake-type high voltage coils provide exceptional mechanical strength. In addition, coils are precompressed to pressure equal to maximum short circuit forces that might occur. No additional distortion or displacement can take place.

TRANSFORMERS

McGRAW EDISON



Forward Look in POWER

at Chrysler Stamping Plant with

28 lines of stamping presses are assured uninterrupted electric power by selective schemes

All the auxiliary switchgear for a complete power plant—and all of it on a common aisle! This unusual installation includes, from left to right, 480-volt, 2400-volt substations and 13.8-kv switchgear.

THE enormous load requirements of Chrysler Corporation's new 34-acre stamping plant at Twinsburg, Ohio: power for 260 presses ranging in speeds from ten to thirty strokes per minute; stamping forces up to 1600 tons; welding loads; lighting loads — all are met by the efficient use of primary and secondary substations and primary distribution equipment.

Chrysler engineers, after analyzing the specific requirements of the plant, designed a system which most adequately met the needs for supplying reliable power. Allis-Chalmers switchgear fills the requirements for dependable, uninterrupted service.

The result is a modern power distribution system combining flexibility, reliability and full power for all stamping, welding and lighting loads.

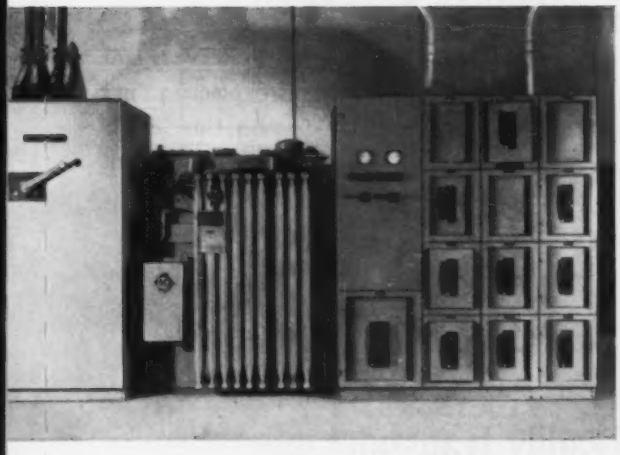
You'll find the answer to all your plant power needs in Allis-Chalmers equipment. Call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Plan to stay ahead... MODERNIZE!

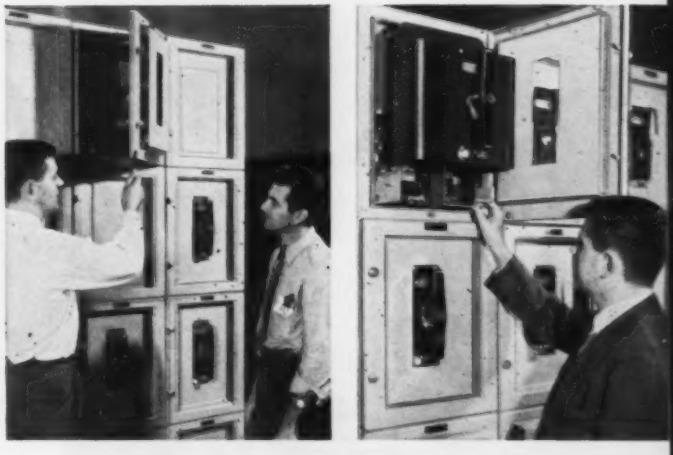
ALLIS-

There are 9000 kva of unit substation equipment in this one room! This equipment was located close to the load center by placing it in a room directly above the production area it serves.

Allis-Chalmers Switchgear



An Allis-Chalmers *First*, the reversible door panel provides breaker storage inside cubicle. Note that three panels are reversed or protruding to provide the additional space in the cubicle for storage of disconnected breaker.



Breaker compartment door swung open showing depth of reversible door panel, eliminating need for extra storage space. Calibrated scales on trip adjusting knobs provide accuracy of settings, action, adjustment and indication.

CHALMERS

A-5764

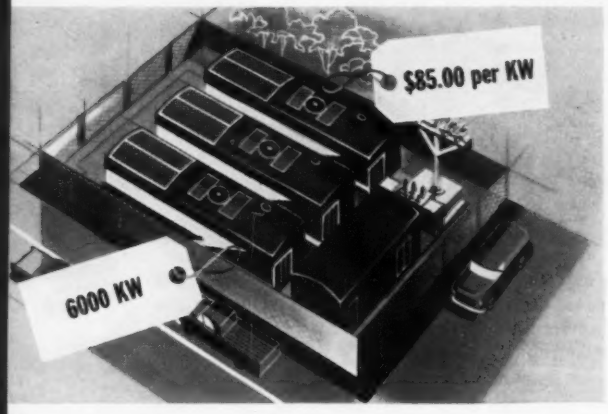
New Slide Rule Free!

. . . for selecting your air circuit breakers in new secondary unit-sub installations, or checking safety of existing breakers.

Permits accurate and fast calculation of short circuit RMS amperes and interrupting capacity of feeder breakers. Write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

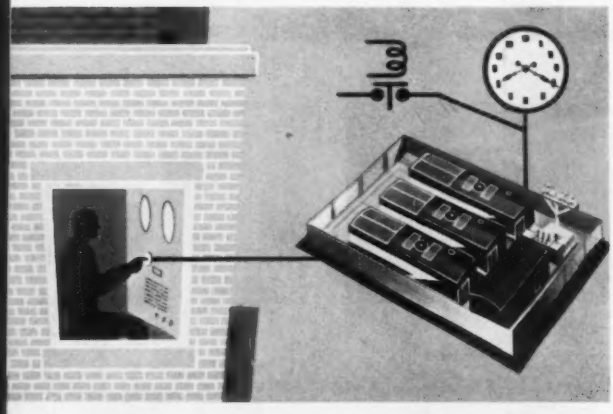
Electro-Motive 6000 KW

Product facts for your peaking plans–



6000 KW at $85.00 per KW*

To perform economically its intended function, peaking equipment must naturally be low in original cost. Electro-Motive equipment meets this cost requirement. *F.O.B. Factory.



Unattended operation

The 6000 KW Peaking and Reserve Plant operates completely unattended. An electrical impulse is all that is needed—from a time clock, dispatcher, current or voltage sensing equipment or a combination of these methods.

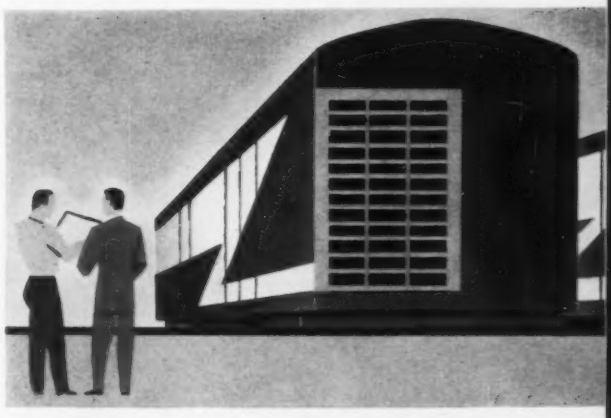
Readily transportable

The Electro-Motive Peaking and Reserve Plant is handled much the same way as many transformers. Components are shipped on standard rail cars or highway equipment.

Peaking and Reserve Plant

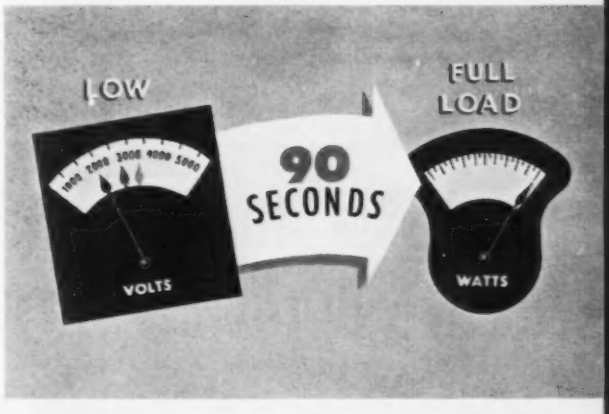
Quiet operation

Silencing arrangements are included to fit the varying conditions under which Electro-Motive Power must operate. Thus considerable freedom can be exercised in location of the equipment.



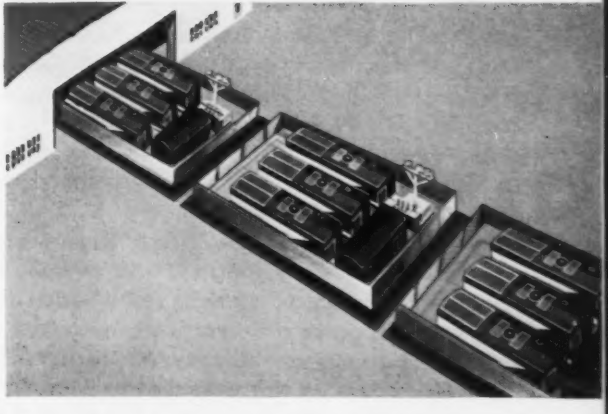
Quick start

The Electro-Motive Peaking and Reserve Plant starts instantaneously. In a matter of seconds it is on the line at full rating, thus fulfilling the requirement for spinning reserve.



One manufacturer

Electro-Motive Peaking Plants are designed, engineered, manufactured and serviced by Electro-Motive. There is only *one* manufacturing responsibility for the complete plant—starting from fuel input to power output.



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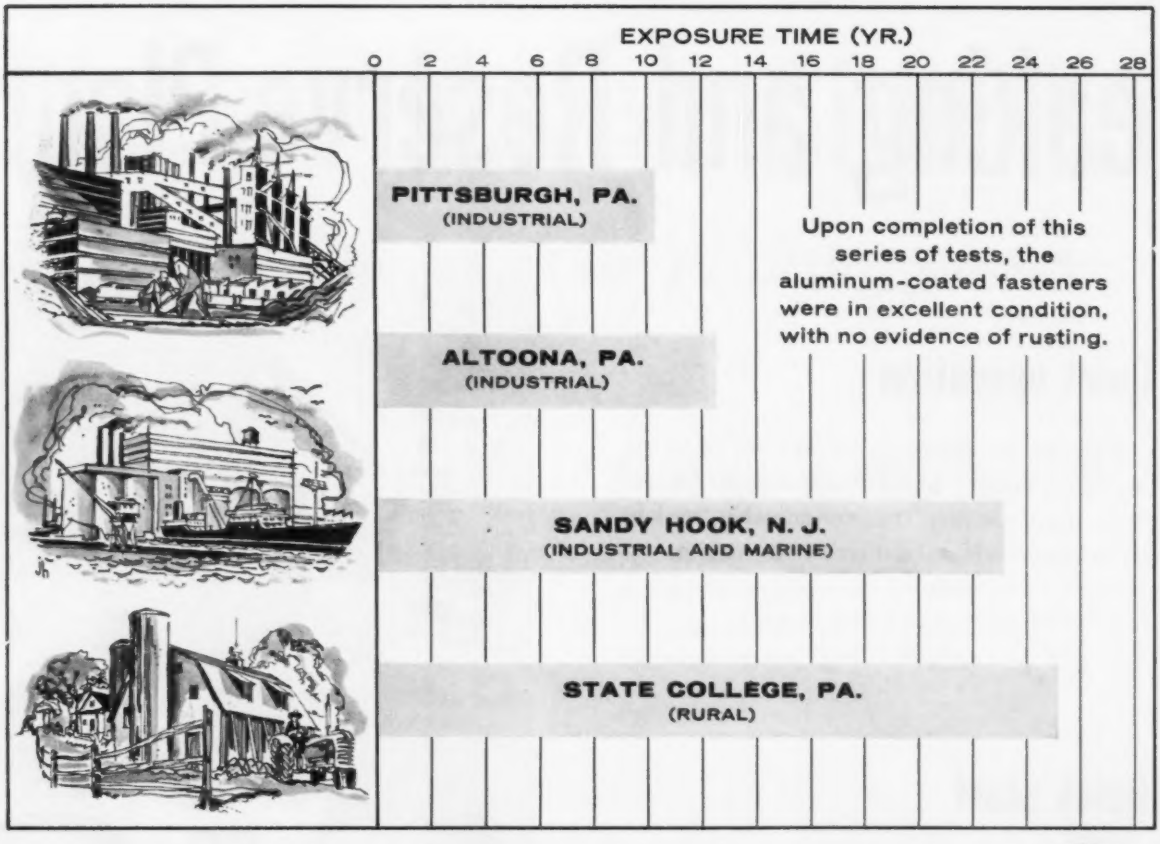
LA GRANGE, ILLINOIS **Sales-engineering offices:** Chicago, New York, St. Louis, San Francisco *In Canada:* **General Motors Diesel Limited,** London, Ontario


EXPOSURE TIME (YR.)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28
PITTSBURGH, PA.
(INDUSTRIAL)
ALTOONA, PA.
(INDUSTRIAL)
SANDY HOOK, N. J.
(INDUSTRIAL AND MARINE)
STATE COLLEGE, PA.
(RURAL)
Upon completion of this series of tests, the aluminum-coated fasteners were in excellent condition, with no evidence of rusting.

ASTM Atmospheric Corrosion Tests Prove Durability of Aluminum Coatings

In atmospheric corrosion tests conducted by the American Society for Testing Materials, steel articles coated with hot-dip aluminum, and others with different coatings, underwent close scrutiny in industrial, marine, and rural areas. In some locations, the aluminum-coated articles were exposed for more than 20 years, yet no evidence of rusting was noticed. On the other hand, competitive coatings had either completely or partially deteriorated.

Based upon these ASTM studies, it is reasonable to assume that fasteners coated with Bethalume, Bethlehem's coating of virtually pure aluminum, will more than prove their worth when exposed in transmission towers and other types of structures.

The Bethalume coating is applied by immersing the fasteners in molten aluminum, after which they are carefully processed to insure clean threads and satisfactory thread fit. The Bethalume coating is composed of two layers—an outer layer of pure aluminum and an iron-aluminum alloy bonding layer. This tight metallurgical bond is similar to that obtained in other hot-dip coating processes. What's more, the coated bolt threads are remarkably clean and smooth-fitting.

If you would like to look into the possibilities of Bethalume-coated fasteners for resisting atmospheric corrosion, get in touch with the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

TIME IS THE MEASURE OF ALL WOOD PRESERVATION

Working or relaxing, you recognize the importance of protecting your investment in wood. . . . For industry, service records show that the longest, most practical protection is AMCRECO pressure treatment.

AMCRECO
PRESSURE TREATED WOOD PRODUCTS

AMERICAN CREOSOTING CORPORATION LOUISVILLE 2, KENTUCKY
SUBSIDIARY OF UNION BAG-CAMP PAPER CORPORATION

If you need condenser and heat exchanger tubes for critical service...

Specify **Phelps Dodge**... a major supplier for nuclear projects!

Phelps Dodge condenser and heat exchanger tubes are currently in use in nuclear energy applications where highest quality and exacting specifications are essential.

Every Phelps Dodge tube intended for use in a nuclear project undergoes a series of severe tests to assure rigid conformance to the required specifications and ability to perform under the rigorous service conditions found in this highly specialized field. Testing facilities used by Phelps Dodge cover not only standard ASTM specifications but also include these special non-destructive tests:

- Eddy-current inspection
- Dye penetrant test
- Ultrasonic inspection

To keep pace with the steadily growing importance of the nuclear power field, Phelps Dodge will soon open one of the largest tube mills in the world at South Brunswick, N. J. This mill will have the most modern automatic tube fabricating machinery, the finest research laboratories and the most advanced testing equipment.

Inquiries regarding your condenser and heat exchanger tube needs, particularly those requiring Electronic and Penetrant Tests, are invited.

PHELPS DODGE COPPER PRODUCTS
CORPORATION
300 PARK AVENUE, NEW YORK 22, N. Y.

PD

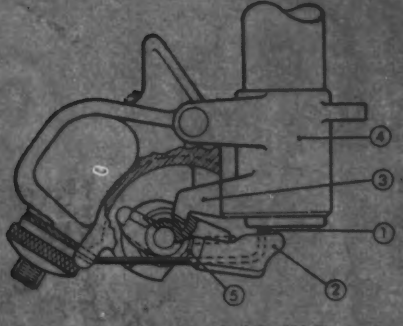
Slam it shut!

S & C's XS Cutout doesn't break the fuse link

It's standard practice for the lineman to slam the fuse tube into the upper contact. There's always a chance that he may be closing in on a fault, so a decisive thrust is required. But when the fuse tube slams into place, the thrust is transferred downward, tending to collapse the toggle and break the fuse link.

S&C's Type XS Cutout has been designed to prevent such link breakage. Instead of using the fuse link itself to restrain the toggle, the XS Cutout uses the cable *flipper* (see illustration, left) to *lock* the toggle in place until the fuse link melts. Yet this locking action in no way impairs the high-speed flip-out of the link cable during circuit interruption. The flipper, powered by a husky torsion spring, insures split-second terminal separation.

The XS Cutout can be used with LOADBUSTER®, S&C's Portable Loadbreak Tool, permitting full load switching with the cutout at no extra cost. For full information, write for Descriptive Bulletin 511, S&C Electric Company, 4421 Ravenswood Ave., Chicago 40, Ill. In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario.



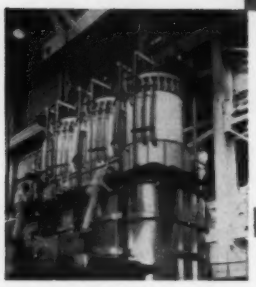
Cutaway view of lower end of the XS Fuse tube showing how fuse link cable (1) holds cable flipper (2) against locking member (3) on ferrule (4). Through this lever system, the fuse link receives only 1/30 of the downward thrust on the fuse tube. Note flipper-actuating torsion spring (5).

Specialists in High-Voltage Circuit Interruption Since 1910

S&C

DISTRIBUTION CUTOUTS

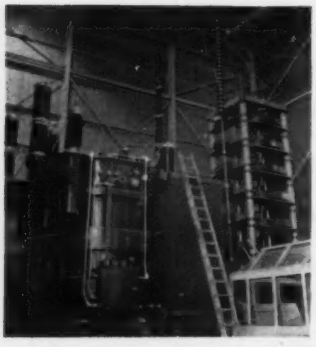
Disconnects • Cutouts • LOADBUSTER® Load Interrupters • Metalclad Switchgear Fuse Links • Power Fuses



OF SKILL AND FACILITIES

Moloney's growth has paralleled that of the electric industry. This growth has been possible because of experience and know-how, skill and facilities . . . all backed by constant research and development programs which have sparked many industry firsts.

Moloney carefully studies industry trends, and utility needs are anticipated whenever possible. Co-operative development between Moloney and their customers is constant in both specific and industry-wide instances.



Skill and Facilities to manufacture large transformers of any type or size required . . . over sixty years experience in the manufacture of transformers . . . continuous product improvement . . . proven service records on utility systems throughout the country . . . are all good reasons for specifying Moloney Transformers . . . All Along the Line.

MOLONEY ELECTRIC COMPANY

Manufacturers of Transformers for Utilities, Industry, and Electronic Applications

MEEB-24

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

MAGNETOGUIDE CONTROL
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M
ELECTRIC

Federal Pacific Metal-Clad Switchgear is made compact...rugged... and in increasing numbers!

Federal Pacific Metal-Clad Switchgear does the job—it's proven by the growing list of installations across the United States and abroad. Most important, Federal Pacific does it with stronger materials, fewer parts, most modern design, and complete safety to operating personnel.

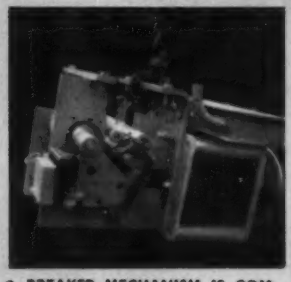
It's rugged...it's safe...it's easy to maintain...it's accepted!

For the full Federal Pacific Metal-Clad Switchgear story call your Federal Pacific engineer or write for Catalog No. 3-440, Federal Pacific Electric Company, Newark, New Jersey.

FEDERAL PACIFIC

The Best in Electrical Distribution and Control Equipment

FEDERAL PACIFIC METAL-CLAD SWITCHGEAR OFFERS UTILITIES THESE SPECIFIC ADVANTAGES:



• **BREAKER MECHANISM IS COMPLETELY SELF-CONTAINED** —Attached to frame by *only four bolts*. No bearings or shafts are in contact with frame. Breaker mechanism can be removed for inspection and maintenance as a unit—simply and quickly.

• **PRIMARY DISCONNECTS ASSEMBLY MOUNTS ON BREAKER AS A UNIT** —Complete six stud bushing sub-assembly mounted directly on breaker facilitates inspection and service.

• **SIMPLE RACKING-IN MECHANISM** —Only two moving parts...provides positive safety inter-locking in any position.

• **CLOSING SOLENOID MAINTAINS TORQUE TO END OF STROKE** — Plunger disc gives solenoid additional pull at the end of the stroke when most needed...to compress closing springs and make positive contact.

The Electrical Week

FUTURE NEWS ▶ **Watch for new Bulletin F of Internal Revenue Service.** It includes some changes in tax deductions allowed on plant and equipment.

House Legislative Oversight Subcommittee will review FPC policy of issuing a single 50-yr license to cover all power dams owned and operated by a utility on a single river. FPC will defend it.

LATE NEWS ▶ **Costa Rica's President Eschandi promises a Red-led group** that he will nationalize the $20 million American Foreign Power sub, Compania Nacional de Fuerza y Luz. Contract provides government may buy company at any time, giving two year's notice at a price based on replacement value of installations and equipment.

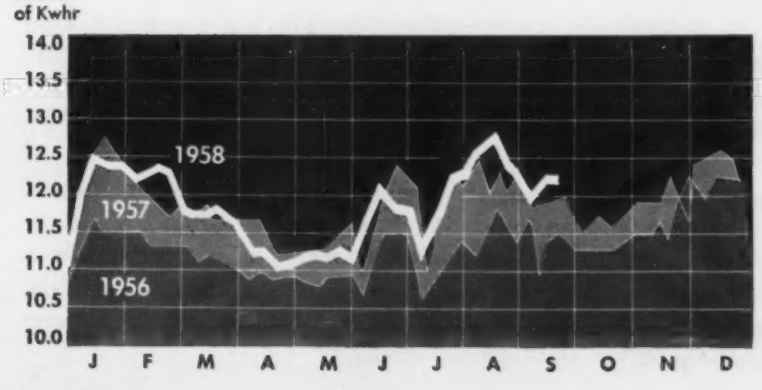
AEC retains three consultants from power companies to advise on underground test shot to be fired next summer in New Mexico to evaluate producing steam for generation from A-bombs.

Rate reductions . . . Louisville G&E and Duke Power both drop electric heating rate from 2¢ to 1½¢. Duke ok's it for water heating.

GE backs voluntary unionism in California. "Basic issue," says vp C. C. Walker, "is that a man should be free to join a union or not join a union. It should not affect getting or keeping a job."

Management changes . . . D. R. McClung becomes president of Pacific P&L, succeeding Paul McKee who is new chairman and chief executive. G. E. Mackenzie, who was vp and treasurer, is elected vp and comptroller . . . Georgia Power elects H. P. Whitehead vp . . . S. W. Horsfield goes to vp, operations and construction in Long Island Lighting . . . Brockton Edison elects P. E. Milstead president, succeeding L. F. Eaton, who retires . . . Harry Ferguson, formerly operating vp of Pennsylvania P&L, will take over as general manager of Carolina-Virginia Nuclear Power Associates.

POWER OUTPUT—UP 2.1% (Week ending Sept. 20), Kwhr 12,240,000,000



Per Cent Change From Previous Year

	Sept. 6	Sept. 13	Sept. 20
Total U.S.	+3.0	+2.5	+2.1
New Eng.	+3.4	+2.4	+2.7
Mid. Atlantic	+1.0	−1.8	−0.8
Cent. Ind	+3.5	+2.2	+2.0
West Cent.	+4.9	+7.7	+4.4
Southeast	+0.6	+1.0	+2.1
South Cent.	+8.8	+14.4	+4.3
Rocky Mount.	+9.8	+9.0	+5.6
Pacific			
NW	−4.9	−4.1	−3.2
SW	+5.3	+1.2	+5.6

Seasonally Adjusted Index 235.2

Week Ago 235.2 Year Ago 230.7

Source: Edison Electric Institute

A TWO-MINUTE PREVIEW OF THIS ISSUE

EDITORIAL ▶ **Are you an AIEE member?** If so, and are interested in providing a greater unity of the engineering profession, you'll want to inform the AIEE Board about joining the National Society of Professional Engineers . . . Electric companies are going to be asked to dig down and come up with $2.8 million soon for the national all-electric promotion program. Why they should do so is outlined in our second editorial. Both are on **p 45.**

EVENTS ▶ **To keep or sell the small utility system?** This question has come to the fore in numerous municipalities and co-op areas where problems of costly modernization have to be faced. Balloting by city voters or co-op members on the choice is due soon in several regions. Three cities—Springfield, Ore., Ft. Wayne, Ind., and Arkansas City, Kan.—are involved in hassles on power company vs municipal service **(p 46).**

Conservationists pounced on Idaho Power, but to little avail, after it had cut stream flow below Oxbow dam to save an erosion-threatened fish trap **(p 47).**

A free clearing house for computer programs has been suggested by Westinghouse Electric Corp., which offers eight of its own as a starter **(p 48).**

MEETINGS ▶ **The World Power Conference met in Montreal,** and the International Large Dams Commission in New York, to exchange the latest information on generation and transmission. Some trends evident from the meetings: A push for more hydroelectric power was noted, as fossil fuel resources were found to be dwindling, and a move to higher transmission voltages seemed likely to follow from hydro development in areas remote from load centers. There was considerable interest expressed in nuclear fuels, especially among delegates from countries short of fossil fuels. For the full report on the meetings, turn to **p 57.**

The world atomic power picture took shape at Geneva, where 5,000 delegates gathered for the Second International Conference on the Peaceful Uses of Atomic Energy. More than 2,000 papers sketched atomic progress so far, as well as plans for the years ahead. US and USSR both lean toward enriched uranium with water or heavy-water coolant; British and French prefer natural uranium with gas coolant. A digest of the most significant data presented at the conference appears on **p 54.**

TRANSMISSION ▶ **Four 9,000-ft oil-filled cables at the bottom of Lake Champlain** now link the transmission systems of Vermont Electric Power Co and the Power Authority of the State of New York. The installation, from Cumberland Head, near Plattsburgh, N. Y. to Grand Isle, Vt., used the longest such cables manufactured in the US. Story and pictures appear on **p 52.**

SALVAGING ▶ **Duke Power Co saves about $10,250 a year** with a new way of processing aluminum scrap. Storage area has been reduced by 75%; processing costs have been cut by 25%; and the reclaimed aluminum (now sold in 99.5%-pure ingots instead of as baled wire) brings 6¢ more per pound **(p 64).**

MANAGEMENT ▶ **NRECA's demands on the next Congress** are outlined by General Manager Clyde Ellis in a speech before Missouri Farmer's Assn in late August. The speech is reproduced substantially in full by Electrical World because the editors feel that all segments of the industry should have the opportunity to read and appraise Ellis' proposals in his own words **(p 87).**

SELLING ▶ **The sales manager holds down an important slot** on the electric utility management team. Just how important a slot it is shows up in a study of organization charts of 86 electric companies: Two out of three top sales management executives are vice presidents. Three out of four report directly to the president. For details, turn to **p 95.**

MANUFACTURERS ▶ **Reductions of one to nine decibels in transformer sound** levels with no increase in unit size or cost has been reported by Westinghouse Transformer Div. . . . Faster programming of digital computers is the aim of two automatic coding programs developed by Remington Rand. Time savings range up to 98%. . . . Worthington Corp adopts a new trademark **(p 74)** . . . General Electric has dispatched its 10-ton Voltage Van on a six-month tour through the Midwest **(p 76).**

NEW EQUIPMENT ▶ **Graphic meters stay on time during power** interruptions up to 14 hours long, use synchronous-carryover drive mechanism powered by a clock-type mainspring . . . Strip-chart recorder-controller has continuous, automatic standardization . . . Tubeless telemetry system for central station use transmits intelligence on load frequency, tie-line power, total station generation **(p 82).**

PEOPLE ▶ **Wilbur Jurden is first president and chief engineer** of Anaconda-Jurden Associates, Inc. Herman H. Boschen is vp and assistant to the chief engineer . . . . New secretary of Northern States Power is Marvyn D. Vance . . . Edmund H. Brown is new general sales manager of Preformed Line Products Co **(p 96)** . . . West Penn Power Co promotes William H. Osterle to manager of research & development dept, also ups Gordon B. Hoffman **(p 98).**

NEXT ISSUE ▶ **Starting next week:** Electrical World's modernization series. More than 100 pages will be devoted to every aspect of electrical systems and electrical operations. The first special report, "Modernize Generation to Save Power Cost," will include the regular steam station design characteristics survey. Future reports will deal with transmission, distribution, service functions, and street lighting.

Ground potentials of substation structures and equipment under fault conditions are equalized by interconnecting all conduits and rails to the station grounds. Fences should be grounded separately. Well drained layers of crushed stone in areas where personnel might be exposed to potential gradients between feet or between hands and feet give additional protection by raising the shock path resistance. **A. Elek, Ontario Hydro Research News, January-March.**

TECHNICAL NOTES

Capital investment in diffusion plants necessary to sustain a nuclear power system is only a small percentage of the total capital investment in the nuclear complex. Diffusion plants would account for about 5% of U. S. nuclear power plant investment projected to 1975 even assuming that all nuclear power plants use slightly enriched uranium.

Radioactive waste products from nuclear reactors are being used in batteries for military applications as a source of electrical energy. Improvements in reactor waste-product recovery systems should result in lower isotope costs, and encourage commercial use in the future.

Radioactive isotopes are being used to speedily and easily check accuracy of kwhr meters. Small dab of radioactive paint on the rotating disc enables a detector to accurately determine time taken by disc to make a complete revolution.

Lignin, a by-product of the production of pulp and paper, can be useful as an admixture to control the rate of stiffening of concrete. Experience shows that widely varying degrees of retardation can be obtained by adjustment of dosage. Besides bringing about retardation, lignin provides the added advantages of reducing water requirement and providing some air entrainment.

FROM EDITORS IN THE FIELD

Aerial coal inventory surveys are saving time and money plus increasing frequency of surveys for Public Service Co of Colorado. With new photogrammetric method, survey takes less than one hour's flying time plus 20 hours by one man to compute volume from three-dimensional contour maps. Old method required 1,000 manhours.

You can't poke a hole in it!

Why make a bushing's oil reservoir in the form of a heavy bronze casting? Isn't it wasteful? After building bushings this way for 50 years, maybe we just can't break with tradition.

Granted, 50 years' experience has a lot to do with it. On rare occasions, the reservoir may serve a special purpose. In the event of flashover, it is one terminal of a blazing power arc. This can burn a hole in a flimsy part, and the bushing is lost. Heavy cast bronze won't permit this -- it hasn't, so far as we know, in 50 years. The small extra cost involved is simply an investment in maximum safety and service.

One of the intangibles you buy in modern O-B condenser bushings is mature knowledge of the business. This shows-up in all kinds of ways and places. It's "the extra value in the package."

Manufacturers of transformers and circuit breakers are glad to supply the bushing of your choice, *when you express that choice.* Make a point of asking for O-B bushings. It's very well worth the slight extra attention.

OHIO BRASS COMPANY, MANSFIELD, OHIO
Canadian Ohio Brass Co., Lt., Niagara Falls, Ont.

Ohio Brass

Four answers to

Thorex Dynagap distribution arresters fit any job . . . give best combination of protective levels

better lightning protection

Order them with your new transformers -- mount them on your crossarms -- specify automatic ground lead isolators -- use external or internal gaps -- choose your method of line connection -- there is a Thorex Dynagap lightning arrester built to fit every distribution job.

Inside each one is the remarkable new Dynagap element, identical in all grades of Thorex arresters; Distribution, Intermediate, and Station Class. Its compact size brings to the distribution field many protective factors once associated only with heavier-duty equipment, and a complete innovation in distribution construction.

For an entirely new order of distribution lightning protection install the Thorex Dynagap -- by any measure, the best in modern arrester design.

OHIO BRASS COMPANY, MANSFIELD, OHIO

Ohio Brass

You can prove

Standards *don't say* all switch insulators are alike -- neither does your experience. Some live longer than others, and give "better mileage" on your investment. Some have a history of little or no trouble; little or no maintenance expense.

Which ones? Look at your own records.

In your own files -- maybe your own handwriting -- and stated in your own terms, are facts that should contain an interesting story. You can see what insulators were installed, when, and the subsequent replacement record, and if your findings are typical, O-B will show a distinct advantage. Remember, this isn't *our* story, it's *yours!*

Switch manufacturers will gladly supply any make of insulator you choose. You need only *make that preference known.* By the simple act of asking for O-B insulators on your new switches, you will continue getting a bonus in performance that your own operating facts can prove is true.

OHIO BRASS COMPANY, MANSFIELD, OHIO
Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

Ohio Brass

4910-H

TWO IMPORTANT NEW FACTS ABOUT KAISER ALUMINUM AAAC

1. AAAC now available on an unlimited basis!

In the three years since Kaiser Aluminum first introduced AAAC, this revolutionary new all aluminum alloy conductor has been offered on a limited basis so that we could keep accurate records of its performance.

During this time, over two million pounds of Kaiser Aluminum AAAC—installed in widely varying locations—have been thoroughly tested and job proved. Results of these 3-year tests prove conclusively that AAAC offers remarkable new advantages in performance, economy and corrosion resistance.

These results have *far exceeded* our most optimistic expectations and we are now ready to offer AAAC for unlimited general use.

2. AAAC accessories now available from leading accessories manufacturers!

Leading manufacturers of armor rods, automatic splices and compression joints have recently established a full range of availabilities for these accessories. You'll find them listed and priced in published catalogs.

Many of these accessories have been tested on the same installations used by Kaiser Aluminum for proving AAAC. These tests have resulted in simplified installation techniques for miles of installed lines.

Your present KW distributor is a dependable source of top quality AAAC accessories.

KAISER ALUMINUM

IF IT CARRIES CURRENT, KW CARRIES IT!

SEND FOR FREE AAAC BOOKLET

Yours for the asking...all the facts about new Kaiser Aluminum AAAC, complete with engineering data and ordering information, wrapped up in a concise, informative booklet. Get your copy now by mailing in the handy coupon below.

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Address_____

City_____ State_____

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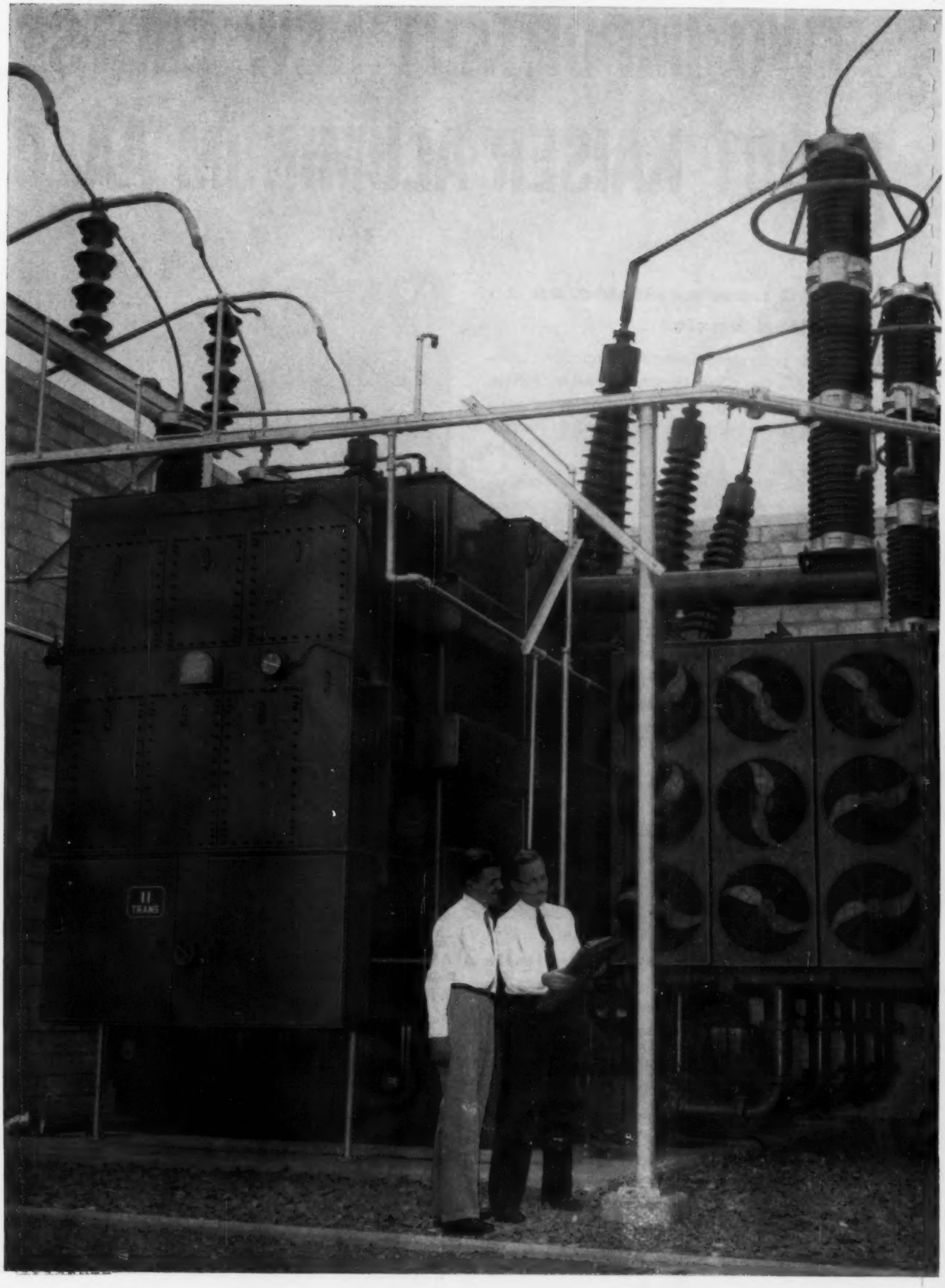
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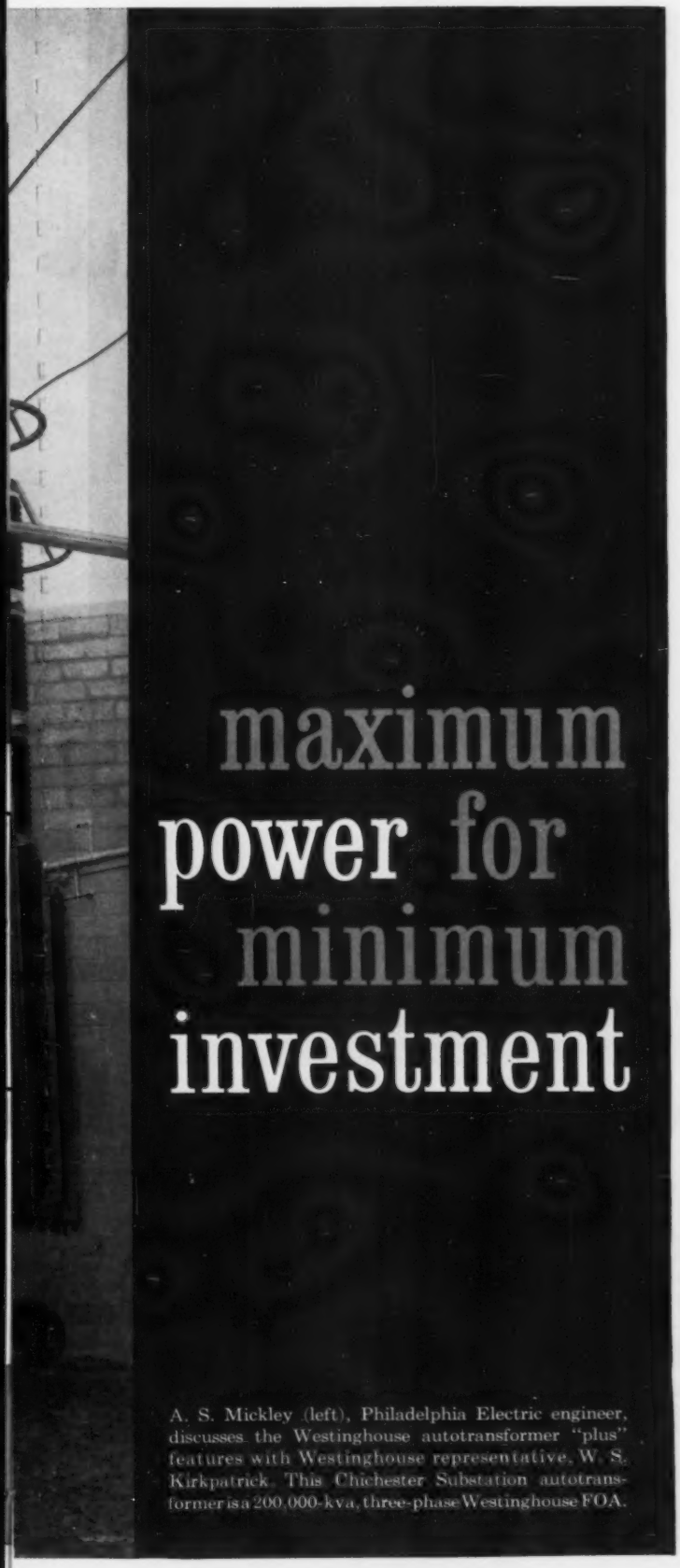
TRANS



A. S. Mickley (left), Philadelphia Electric engineer, discusses the Westinghouse autotransformer "plus" features with Westinghouse representative, W. S. Kirkpatrick. This Chichester Substation autotransformer is a 200,000-kva, three-phase Westinghouse FOA.

How Westinghouse autotransformers help provide ECONOMIC system interconnection

Westinghouse autotransformers have gained wide acceptance for economic interconnection of different voltage systems. A recent example of this is the installation at Philadelphia Electric Company's Chichester Substation of a tie transformer between their 230- and 138-kv systems.

Early interest by Westinghouse engineers in the problems of interconnection led to the development and improvement of the Westinghouse autotransformer . . . helped provide today's *economic* system interconnection—maximum power for minimum investment—with:

- Reduced initial cost
- Reduced losses
- Reduced impedance
- Reduced weights and dimensions
- Improved regulation

Westinghouse leadership in autotransformer design has been maintained by continuous development of those features which best serve the electric utilities—development made possible through earnings plowed back into research and engineering. Here are a few of the big developments first incorporated and now available in Westinghouse transformer design:

Shell-form, Form-Fit® construction—superior mechanical and dielectric strength.

Forced-oil cooling—extended service life, increased overload capacity, low pressure, high-volume oil system with vertical ducts.

New Inner-Cooled construction—lower impedance, improved performance, up to 25 percent space and weight reduction.

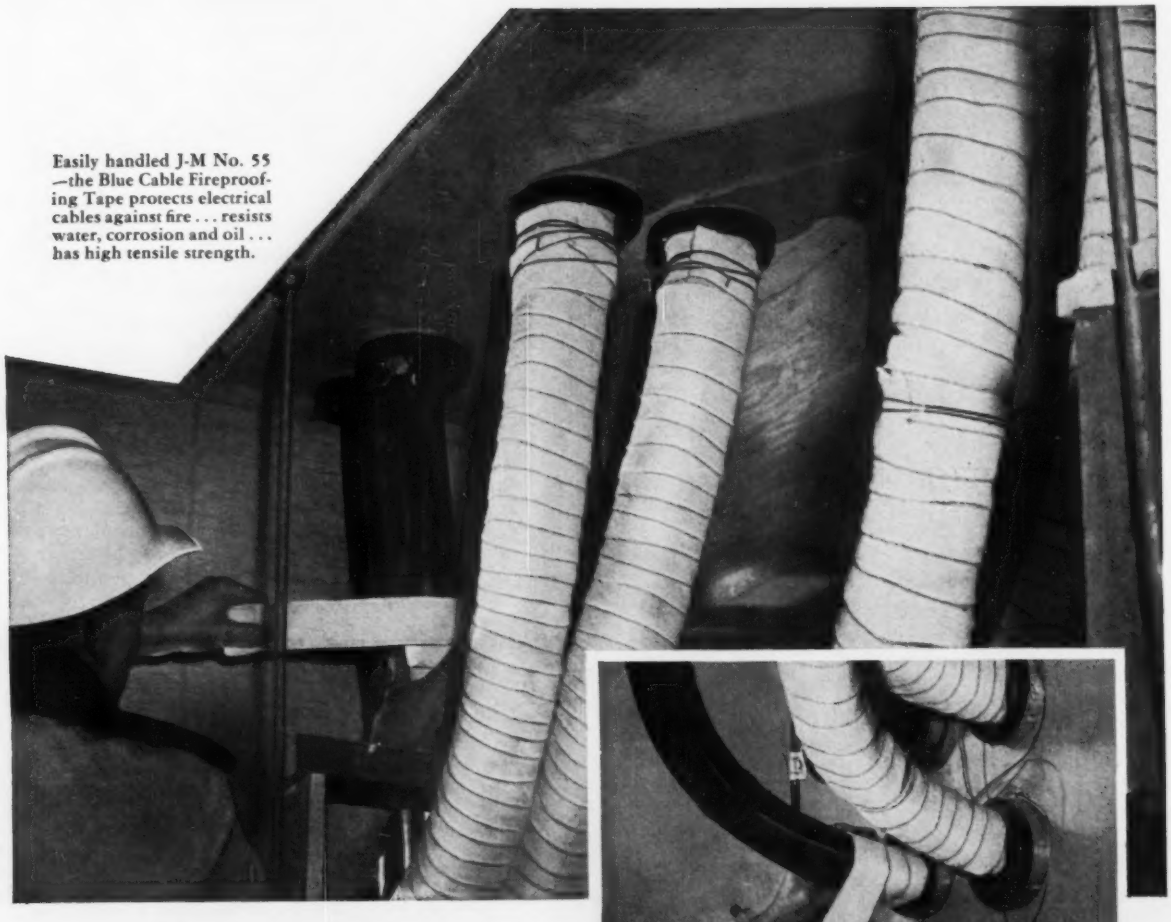
New Insuldur system*—10 percent more overload capability—economically and safely.

For the full story of how all these Westinghouse developments are built into Westinghouse autotransformers to help provide *economic* system interconnection, call your Westinghouse representative . . . or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-70894-R

*Trade-Mark

YOU CAN BE SURE...IF IT'S Westinghouse

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV MONDAYS



Easily handled J-M No. 55 —the Blue Cable Fireproofing Tape protects electrical cables against fire . . . resists water, corrosion and oil . . . has high tensile strength.

Photos courtesy of Lone Star Cement Co., Dallas, Texas

ELECTRICAL CABLES . . .

Fireproofed quickly . . . to last!

with J-M No. 55 Asbestos Cable Fireproofing Tape

Here is the effective, time-saving fireproofing for electrical cables . . . designed for lasting protection.

Made of asbestos, Johns-Manville No. 55 Cable Fireproofing Tape offers many outstanding advantages. It will not support combustion; repels water, resists flame, fungus, mold, corrosion and oil. Explosive or toxic gases will not develop under arc. High tensile strength is maintained even after burnout.

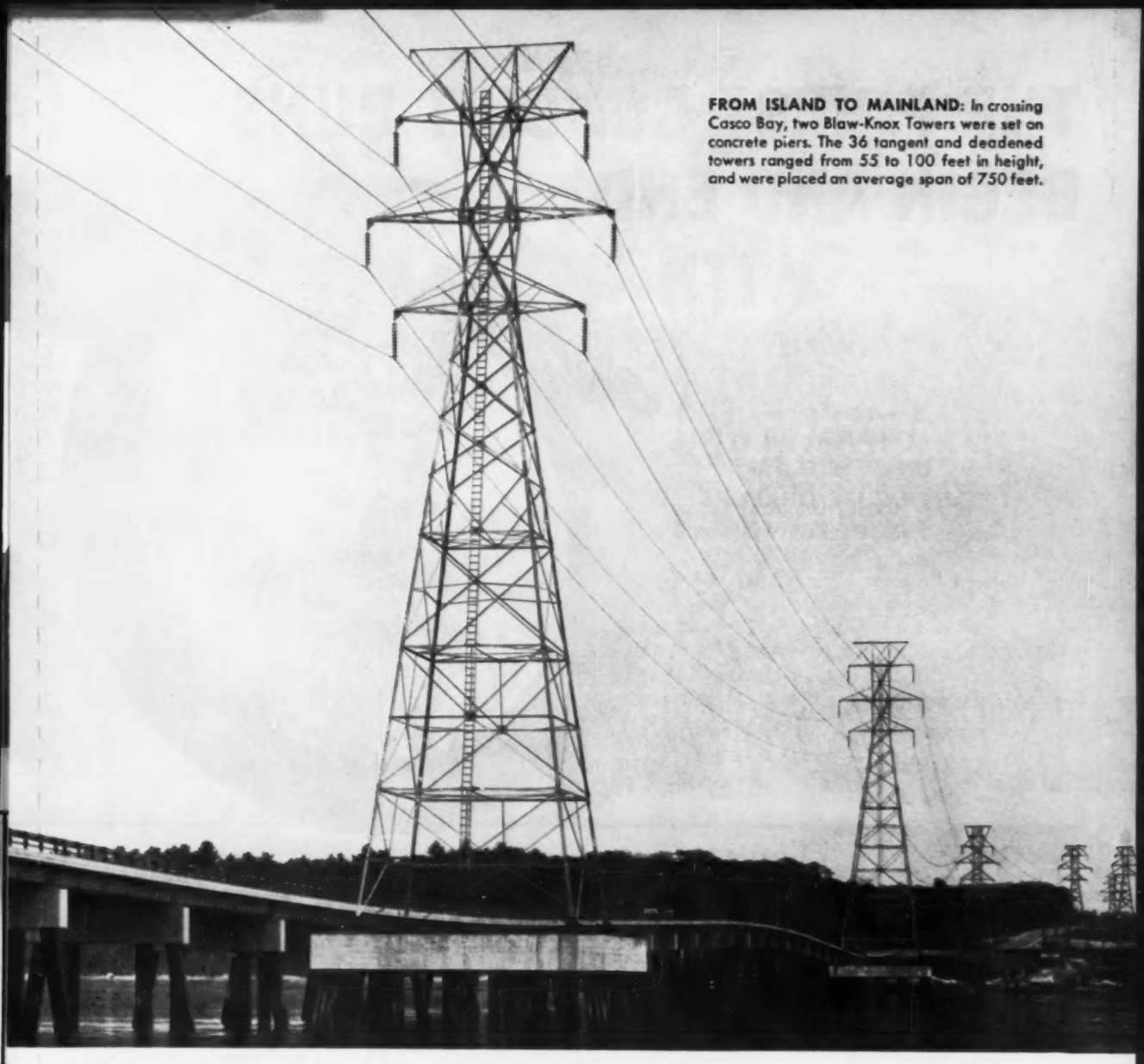
In addition, No. 55—the Blue Cable Fireproofing Tape is impregnated with a silicone material that provides low water absorption and high moisture repellence. Thus, damage from ground water, flooding, fog or humidity is minimized. Selvedged edges prevent threads from pulling out and weakening the tape. There are no ragged, unimpregnated edges through which ground water can penetrate.

J-M No. 55 Cable Fireproofing Tape is simple to apply, even in confined spaces. It won't droop, sag, or unravel . . . assures a tight, lasting wrap. Furnished in widths from 1" to 3" in 25- or 100-foot rolls, it is easy to handle and stock.

For complete information on J-M No. 55 Cable Fireproofing Tape, write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

Johns-Manville ASBESTOS TEXTILES

JOHNS-MANVILLE JM PRODUCTS



FROM ISLAND TO MAINLAND: In crossing Casco Bay, two Blaw-Knox Towers were set on concrete piers. The 36 tangent and deadened towers ranged from 55 to 100 feet in height, and were placed an average span of 750 feet.

Central Maine chooses Blaw-Knox Towers to carry lines from new Cousins Island Plant

The new Yarmouth Steam Plant—the newest and potentially the largest in Maine—is the latest development by Central Maine Power Company to meet the increased needs of its growing number of customers. The new showcase plant will use two 44,000 kw turbine-generators along with the latest and largest transformers and condensers in the state.

To carry the 115,000 volt lines from Cousins Island to the Moshers substation in Gorham, Blaw-Knox designed and fabricated 36 steel transmission towers. Working with Central Maine's engineers Blaw-Knox was able to bring over 40 years of transmission tower experience to the job. Basic concepts evolved from this extensive experience are used to build towers that are superior in strength, simpler to erect, easier to modify.

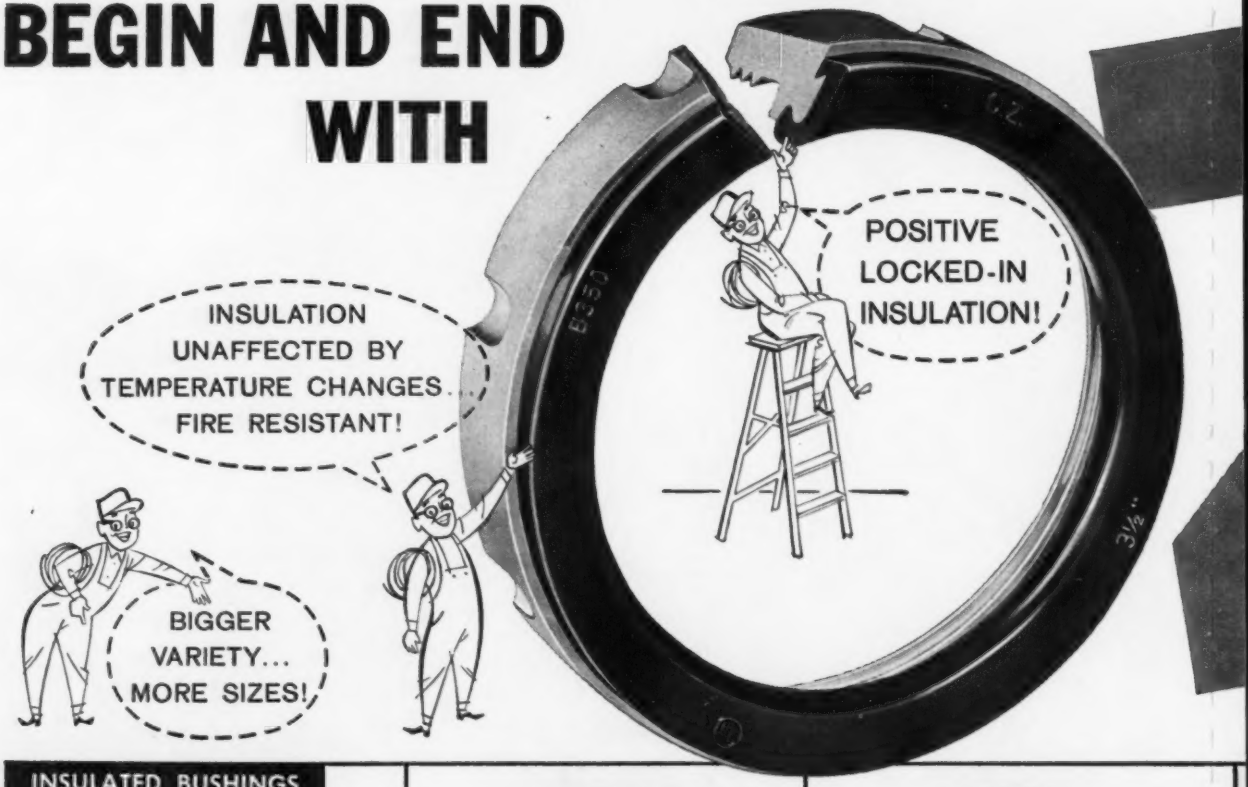
See how this background can pay off in meeting your own tower requirements. For details, send for Folder 2509 and tell us your needs. We'll gladly give you our recommendations and a quotation.

Transmission Towers—Steel Transmission towers, custom-built for each installation . . . multi-circuit and other special structures . . . and antenna towers, guyed and self-supporting types for AM • FM • microwave • communications • radar • parabolic antennas

BLAW-KNOX

BLAW-KNOX COMPANY
Equipment Division
Pittsburgh 38, Pennsylvania

THE FINEST CONDUIT RUNS BEGIN AND END WITH



INSULATED BUSHINGS

1 Type "B" — Designed for prevention of grounds. Made of highest grade malleable iron or steel, insulated with Bakelite molded and locked into bushing. Sizes: ½" to 6".

2 Type "AB" — New addition to the O.Z. line... made of high-strength aluminum alloy with interlocked Bakelite insulation. Sizes ½" to 6".

3 Type "BL" — Combines protection of insulated bushing and means for making quick, positive ground connections. Consists of Type "B" equipped with combination lug. Sizes: ½" to 6".

7 Type "E" — For spacing and individually insulating wires as they emerge from conduit. Molded canvas Bakelite covers have high dielectric and mechanical strength. Sizes: ½" to 6".

GROUNDING BUSHINGS

8 Type "GB" — Corrosion-resistant bronze. Ideal for grounding banks of conduit where metallic-protected cable is used. Sizes: ½" to 6".

9 Type "IGB" — Similar to "GB" except insulated with Bakelite collar locked into bushing. Sizes: ½" to 6".

O.Z. bushings

O.Z. holds the line on quality — with the line that gives you greatest selection!

Whatever your bushing requirements, O.Z. has the type and size you need! As with all O.Z. products, *completeness* is the keynote! And, as always, this completeness is backed by another O.Z. constant: *quality!* O.Z. bushings utilize only the traditionally-superior materials: Cadmium-plated or hot-dip galvanized iron and steel, bronze, and molded canvas Bakelite . . . all at prices competitive with substitute materials . . . all time-proven in finer conduit runs everywhere. For more information on O.Z. bushings, call your local O.Z. distributor or write direct to the company.

4 Type "SB" — For use on conduit having no threads. Case-hardened cup-point set screws for fastening. Sizes: ½" to 6".

5 Type "SBT"—A cadmium-plated bushing for thin-wall conduit application. Fastens with case-hardened, cup-point set screws. Sizes: ½" to 2".

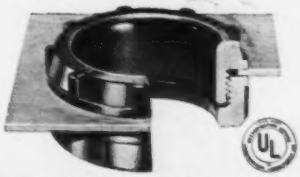
END BUSHINGS

6 Type "EL" — Provides the protection of end fittings and permits quick, positive ground connection by means of combination lug. Sizes: ½" to 6".

INSULATING BUSHINGS

10 Type "A" — Made of molded canvas Bakelite having high dielectric and mechanical strength. Sizes: ½" to 6".

11 Type "BB" — Molded Bakelite. Male thread. Installed with locknut. Insulates cables passing through metal boxes or troughs. Sizes ½" to 6".



12 Type "ABB" — Combination of Type "A" and "BB" bushings to insulate cables passing through metal boxes or troughs. Sizes: ½" to 6".

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND STREET • BROOKLYN 17, N. Y.

Sales Office and Warehouse: 406 So. Cicero Avenue, Chicago 44, Ill. • ESterbrook 9-0326
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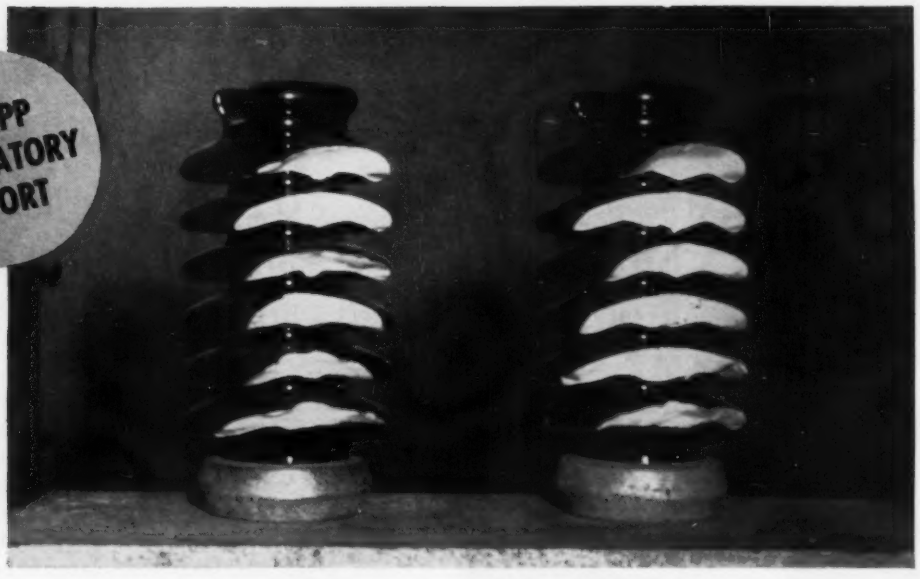
- CAST IRON BOXES
- CABLE TERMINATORS
- POWER CONNECTORS
- SOLDERLESS CONNECTORS
- GROUNDING DEVICES
- CONDUIT FITTINGS
- INTERLOCKED ARMOR CABLE FITTINGS

A LAPP LABORATORY REPORT



BROKEN CORRUGATIONS...

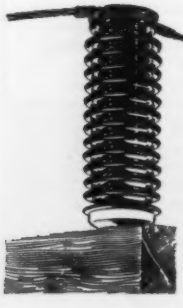
how do they affect performance?

THE PROBLEM: It is well known that mechanical damage to the Lapp Line Post insulator causes much less loss of its electrical characteristics than does such damage to pin-type or suspension insulators. Good maintenance on a system generally does call, however, for changing out insulators that show sign of damage. How urgent is it to replace insulators reported as being damaged? The answer, of course, involves security of the system as well as economy of maintenance, and can be found only in evaluation of characteristics.

THE TEST: Utility engineers whose company operates a large system on Lapp Line Posts wished to set a standard procedure for Line Post maintenance. They visited the Lapp plant and had us make laboratory tests of 35 kv Lapp Line Posts, measuring dry and wet flashover value with petticoats progressively broken off. (We used a hammer to simulate mechanical damage in the field.)

THE FINDING: With the top petticoat broken off, dry flashover was reduced less than 1%, wet flashover by slightly less than 4%. With all six petticoats gone (as shown in the photo) flashover tests showed a loss of 7% in both dry and wet 60-cycle flashover. (In a similar test made previously, we found loss of all corrugations reducing wet flashover somewhat more—apparently the exact pattern of the break has an important effect.)

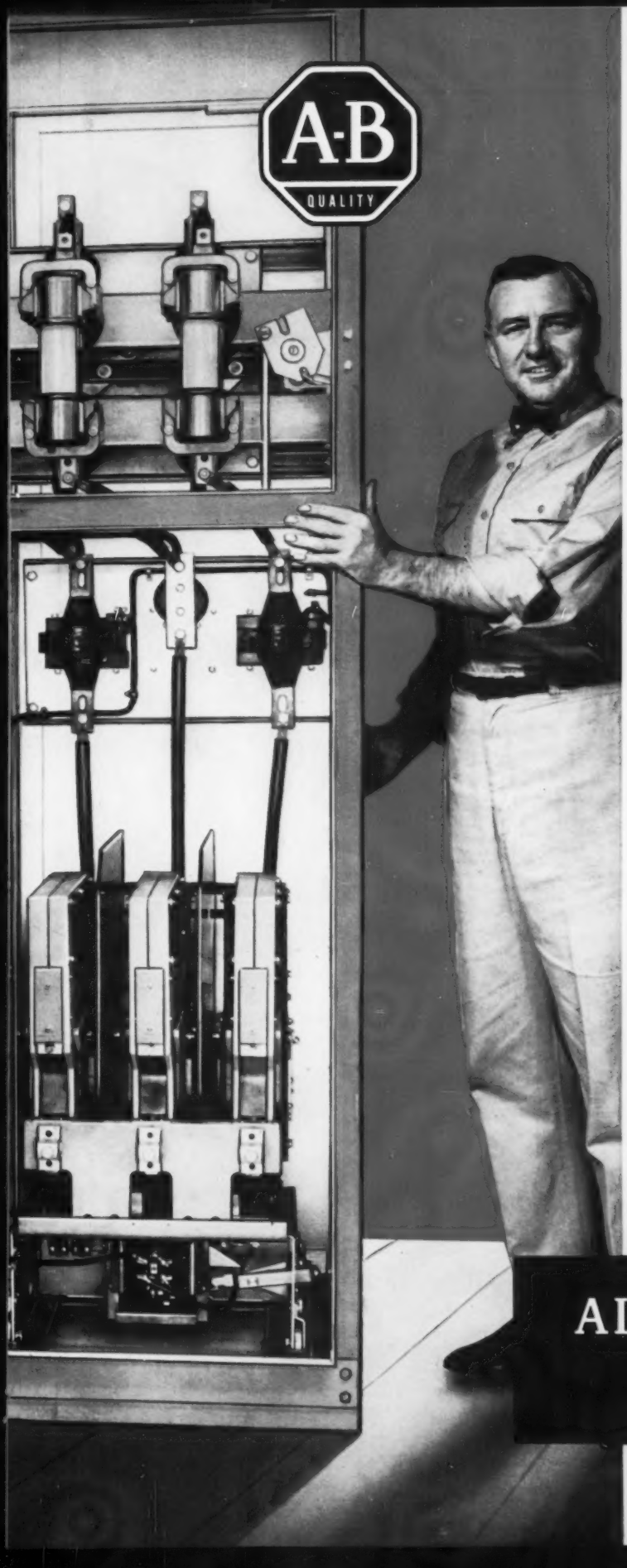
THE CONCLUSION: The strong post body of the Lapp Line Post remains intact, and an insulator with all petticoats broken will handle normal operating conditions. Loss of one or two corrugations poses no urgency whatsoever. The company for whom this test was made will replace insulators so damaged only when convenient.



Lapp

THE MORAL: Use Lapp Line Posts on your system for distribution and subtransmission up to 88 kv. They'll give you an extra margin of operating security, low maintenance cost and long life.

Lapp Insulator Co., Inc., LeRoy, N. Y.

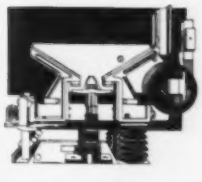


Tough high-voltage job?...Here's the answer!

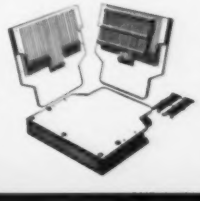
Allen-Bradley High-Voltage Air Break Starters are ideal for frequent switching, reversing, plugging, or jogging.

A tremendous operating life has been built into these high-voltage air break starters . . . resulting from the use of the simple solenoid contactor. It's the same design—having only ONE moving part—that provides millions of trouble free operations in Allen-Bradley's low-voltage controls. These starters are made in a complete line for all types of service. Send for Publication 6080, today.

ONLY ONE MOVING PART
With this simple solenoid design, all trouble causing pivots, pins, and flexible jumpers are eliminated. Straight up-and-down motion of contactor is virtually frictionless.



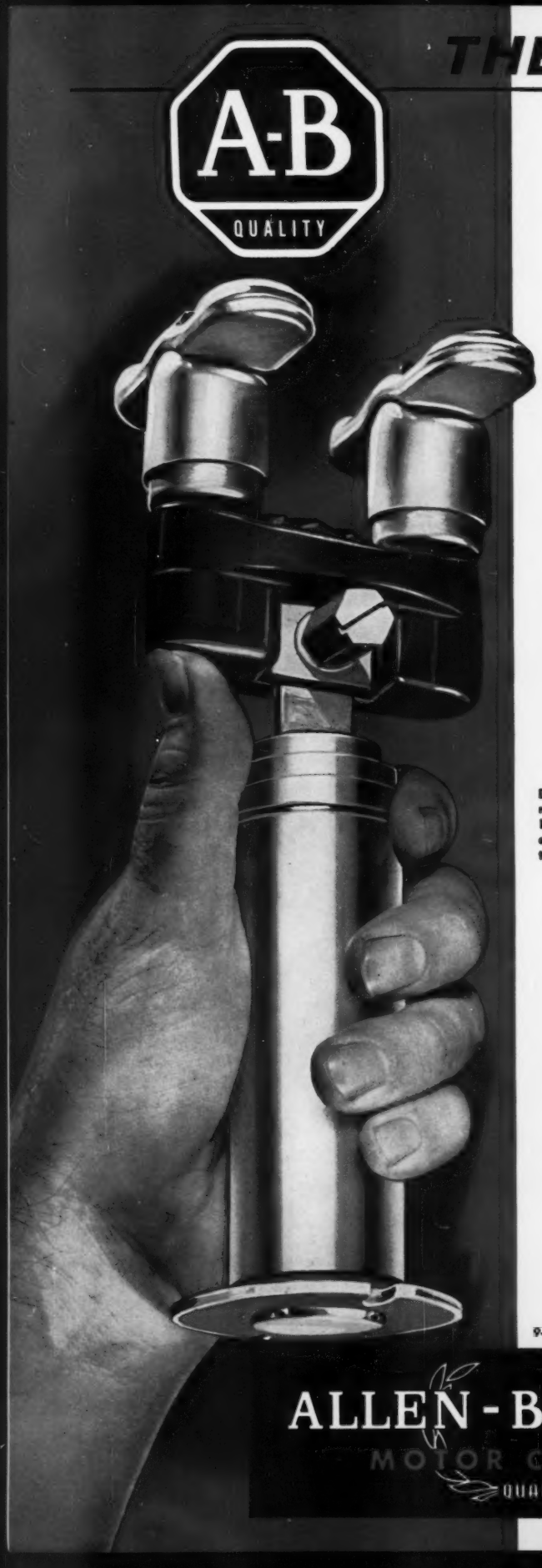
DOUBLE BREAK CONTACTS
Allen-Bradley silver alloy contacts never need maintenance . . . they remain in perfect operating condition until completely worn away. Vertical motion assures uniform contact pressures at all times.



FASTER ARC SUPPRESSION
The air break contactor employs a completely different blowout design and novel arc chute which assure rapid arc extinction. Chutes are molded from arc resistant material.

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.
9-58-M



THE ONLY LINE OF

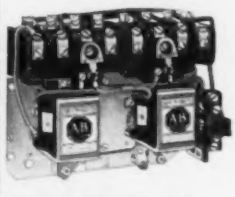
D. C.
MOTOR STARTERS
with modern
SOLENOID CONTACTORS

With Allen-Bradley, you get D. C. motor control that is *completely modern!* It uses the simplest switching mechanism yet conceived . . . the solenoid contactor with only ONE moving part. There are no bearings to stick . . . no jumpers to break. This assures millions of trouble free operations. And the double break, silver alloy contacts never need maintenance. Available in ratings up through Size 4. Write for details.

CONTACTORS

Bulletin 202 solenoid type contactor. In ratings to 150 amp. Also, clapper type to 600 amperes.

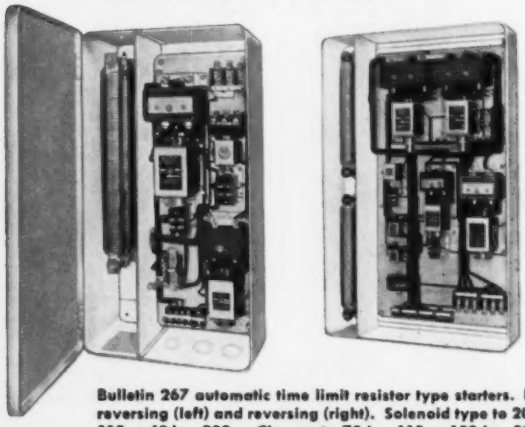
FULL VOLTAGE STARTERS



Bulletin 205 full voltage reversing starter. Ratings to 1½ hp, 115 v; 2 hp, 230 v.

Bulletin 209 full voltage starter. Available in ratings up to 1½ hp, 115 v; 2 hp, 230 v.

REDUCED VOLTAGE STARTERS



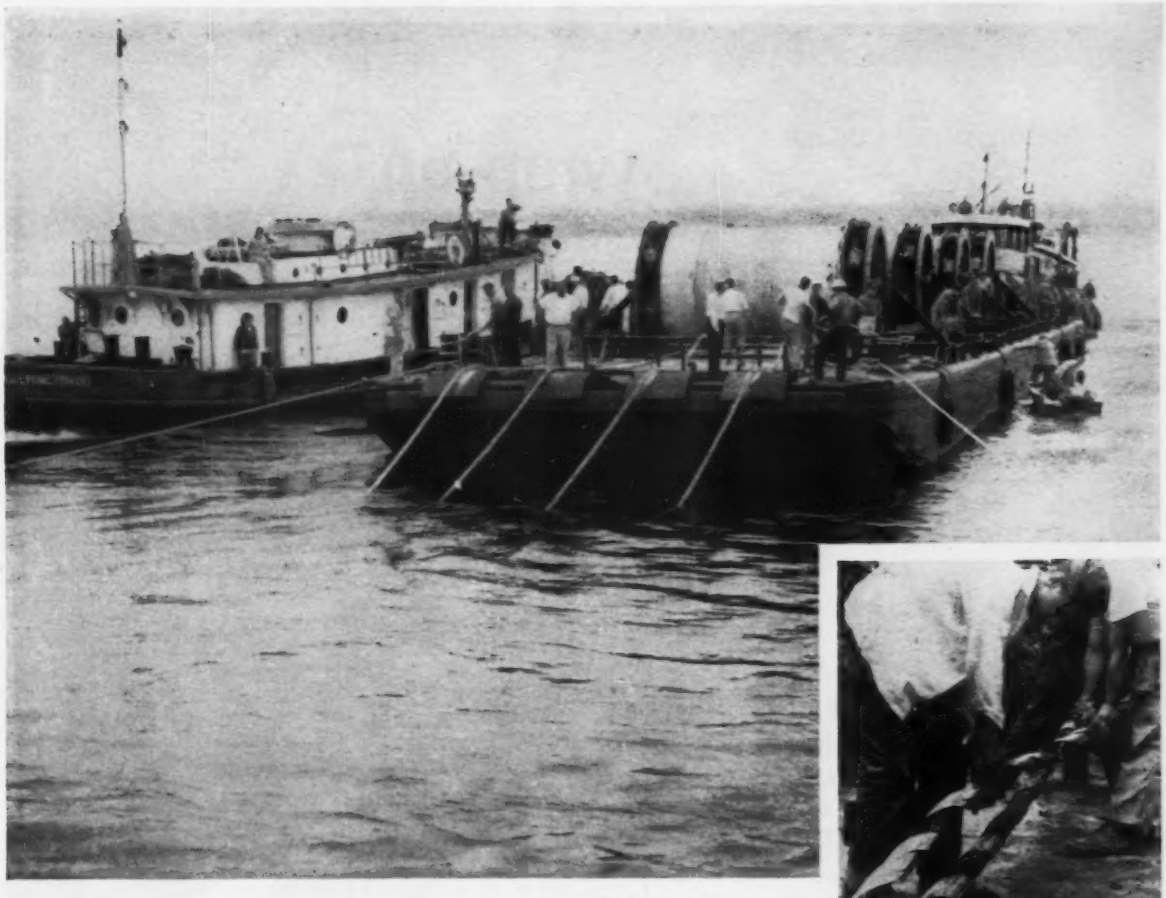
Bulletin 267 automatic time limit resistor type starters. Non-reversing (left) and reversing (right). Solenoid type to 20 hp, 115 v; 40 hp, 230 v. Clapper to 75 hp, 115 v; 150 hp, 230 v.

9-5B-MR

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

MAIN OFFICE and Factory
1316 S. Second St.
Milwaukee 4, Wis.

In Canada: Allen-Bradley Canada Ltd., Galt, Ontario



Okonite cable jacketed with Du Pont neoprene helps deliver St. Lawrence power to Vermont

To bring electricity to Vermont from the St. Lawrence Seaway and Power Project, four Okonite submarine cables, each 9000 feet long, were installed across Lake Champlain. The buried ends, leading from aerial terminal points to the lake shore, are protected with Okosheath Protective Covering, a vulcanized sheath developed by Okonite research. Fifteen years ago Du Pont neoprene was selected as a component in "OPC" because of neoprene's unusual resistance to corrosion and physical abuse.

The 115 KV, 161 MVA rated, submarine line will supply 100,000 kilowatts, approximately a quarter of a million horsepower. The line is the longest oil-filled cable ever manufactured in the United States.

Problems of overheating due to induced currents required removal of the steel armor on the buried portion of the line. However, to provide the protection that a directly buried, lead-sheathed cable requires, the "OPC" covering with Du Pont neoprene was specified. It prevents deterioration of the lead sheath by corrosion from soil acids, alkalies and moisture. In addition, neoprene protects the lead sheath from damage during installation.

This is another example of neoprene's versatility and dependability. Of all resilient materials, only rugged neoprene has a combination of so many durable properties. It resists sunlight and weather, oils and chemicals, heat, flexing, cracking, abrasion and cutting. Neoprene also resists oxidation and ozone. It is outstanding among cable jacketing materials for its ability to retain its properties for long periods of time.

Ask your supplier about wire and cable jacketed with Du Pont neoprene. It is available in many conductor types and voltage ratings to meet your requirements. For on-the-job reports of neoprene's performance, write for the ELASTOMERS NOTEBOOK to E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Dept. EW-9, Wilmington 98, Delaware.

DU PONT

REG. U. S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

NEOPRENE

made by Du Pont for 26 years

wrap up
splicing problems
for keeps
Field experience proves performance advantages of Preformed splices
In hundreds of thousands of applications, only one failure of a Preformed splice has been reported—and that was caused by inadequate preparation of a heavily corroded conductor.
This distinctive performance is the result of soundly engineered features: (1) uniform radial pressure of the splice rods; (2) full area of contact; (3) the flexibility of the rods which causes the grit particles to penetrate existing oxides and establish permanent electrical contact with the conductor; and (4) the inherent resiliency of the splice which maintains consistent surface contact with the conductor throughout extremes of line tension and temperature variation. These combined characteristics are your assurance of unfaltering mechanical and electrical performance at all times.
And, most important, no tools are needed to install a Preformed splice; the application is made entirely by hand and takes but a fraction of the time required for other types of splices.
There are Preformed splices to solve almost every splicing problem. They can be furnished to hold the full-rated strength of any standard transmission or distribution conductor.
Write for additional technical information. PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland
. manufacturer of armor rods, dead-ends, Guy-Grip dead-ends and other line accessories.
PLP
10 YEARS OF Power Line Progress
You can look up to Preformed
Made in accordance with or for use under U.S. Patent Nos. 2,609,653; 2,275,019; 2,587,521; and 2,691,685. Other patents pending.

How Copes-Vulcan control systems boost power plant efficiency

Copes-Vulcan puts combustion control at operator's finger tips

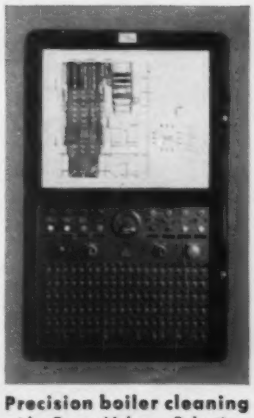
Equipped with easy-to-read recorders and control stations, this compact Copes-Vulcan panel centralizes operator control and simplifies boiler operation. This modern system features circuit simplicity with independent control loops on air flow, fuel loading and furnace draft. Drive units assure accurate positioning and fast response, and eliminate the need for interconnecting control loops.

A custom installation . . . a continuing service

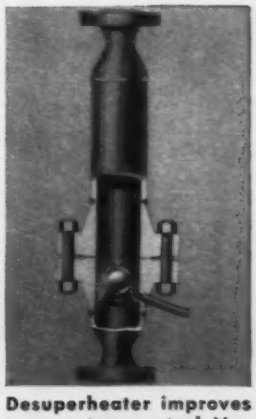
Copes-Vulcan Combustion Control is just part of an integrated boiler control system for regulating feed water, boiler steam temperature and boiler cleaning.

Whether furnished in individual units or integrated into a single system, each installation is tailored to meet specific requirements of generating capacity, load range and fuel. Copes-Vulcan supplies skilled service, when needed, for the life of the installation.

Write for Bulletin 1032 showing a Copes-Vulcan control system working at a showcase generating plant.



Precision boiler cleaning with Copes-Vulcan Selective-Sequence or Automatic-Sequential soot blowing systems. Space-saving panel permits easy monitoring, flexible programing . . . assures thorough cleaning with less steam and/or air. Write for Bulletin 1029.



Desuperheater improves temperature control. New Variable-Orifice Desuperheater* holds reduced steam temperature constant only 20° downstream from desuperheater outlet, even over a 50-to-1 load range. Write for Bulletin 1037. *Patent applied for

Copes-Vulcan Division
BLAW-KNOX COMPANY
Erie 4, Pennsylvania

"X-RAY" VIEW of the SRT, showing the volt-sensitive regulating mechanism at the top of the core-coil assembly and the under-load tap changer at the lower part. SRT's will be available in the following ratings:

2400 volts, 10 through 25 kva
4160 volts, 10 through 37½ kva
4800 volts, 10 through 50 kva
7200 and 7620 volts, 10 through 75 kva
12,000 and 14,400 volts, 10 through 100 kva

L-M Announces the

SRT

THE WORLD'S FIRST

Self-Regulating distribution Transformer

A Revolutionary New Engineering Development That Offers Utility Companies Better Revenue, Better Service To Their Customers

By **A. R. WAEHNER**
Director, Transformer Sales, Line Material Industries

The new L-M Self-Regulating Transformer consists of a Round-Wound® distribution transformer with extra taps on the *primary*, and a regulating mechanism that is volt-sensitive on the *secondary*.

The device switches primary taps, *under load*, to change the transformation ratio as needed to maintain a constant normal voltage to the customer, regardless of line or load changes. The SRT provides 10% of regulation in four 2½% steps.

Better Revenue For The Utility

The SRT is a break-through into a whole new world of customer service and profitable operation, because it corrects the voltage *at the point of use*. By maintaining proper voltage, the SRT prevents the drop in billings caused by *undervoltage*, which in the aggregate can represent a considerable loss.

Improves Service To Customers

With correct voltage, lights are brighter; television sets, clothes dryers, air conditioners, and other electrical devices operate more efficiently; ranges heat faster.

The SRT also prevents *over-voltage* from reaching the user. This greatly reduces burnouts of TV tubes, and of incandescent lamps—the latter a very obvious saving to a utility with a lamp-replacement program.

The SRT is another outstanding contribution of The Thomas A. Edison Laboratories of McGraw-Edison Company.

Features Of The SRT

Adapt-a-Tap Range Selector: The SRT provides a full 20% range within which taps for the 10% automatic regulation in four 2½% steps may be selected—all below, straddle, or all above normal. Thus the SRT can be located anywhere on the line—the end, the middle, or near the substation.

Nominal 3½-Volt Band Width: The midpoint is set, for example, at 120 volts. The SRT changes taps whenever the voltage drops to 118¼ or rises to 121¾. Each operation occurs only after a time delay, which prevents undesirable operation and "hunting" on switching surges and momentary variations outside the band width.

Reliability: One 2400-volt tap changer has now operated more than 250,000 times—equivalent to over 40 years' life on a 25 kva transformer.

Economy: Under normal conditions the SRT will prove more economical than other means of voltage correction. Thus it opens unlimited horizons to the distribution-system planning engineer for more effective design.

Available For Tests

The initial production of the SRT will be sold to progressive companies to explore the benefits, in improved revenue and better customer service, that are available from this outstanding new development. Thus each company can learn, for itself, the extent to which the SRT can make a substantial contribution toward keeping revenue up and costs down.

Get The Details

L-M Field Engineers and Apparatus Specialists can furnish detailed information about the SRT. If you would like this information, please get in touch with your L-M Field Engineer, or phone or wire me at Line Material Industries, Milwaukee 1, Wisconsin.

LINE MATERIAL Industries
McGRAW-EDISON COMPANY
Distribution Transformers

McGRAW EDISON

350

Guy rod, pipe and parts are all firmly packaged together. Storeroom space has been reduced considerably because it is no longer necessary to have a separate bin for each part.

Why L-M Luminaire Supports Are Easy To Handle, Easy To Store

L-M's complete line of steel or aluminum luminaire supports is shipped packaged, with guy rod, pipe and parts firmly strapped together. All threaded parts of each support are protected with a plastic coating. The pole fitting and brace support are welded to the bracket, which reduces the number of parts.

How Packaging Saves Time and Storeroom Space

Because all parts for L-M's luminaire support are packaged together, they can be stored as a unit, eliminating separate bins for each part. Parts are not lost in shipment or in the storeroom when packaged together. The correct components will always be sent to the job site.

L-M's luminaire supports are designed for—

Appearance: L-M provides four harmonizing styles of supports so that several types can be used in the same installation, if desired. The supports are "upsweep" in design to give a handsome appearance.

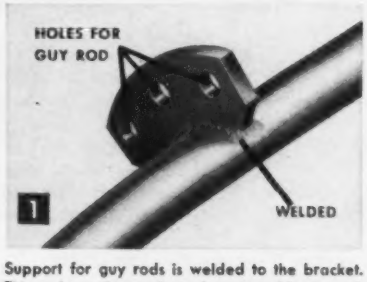
Strength: Completely wind-tunnel-tested, L-M's luminaire supports are designed to withstand winds up to 150 M.P.H., to assure generous lateral strength. The supports can also withstand heavy non-sustaining vertical loads up to 250 pounds without collapse or rupture. The pole fitting and brace support are welded to the bracket to insure ample strength and minimize vibration.

Meet EEI-NEMA Standards:

L-M supports meet EEI-NEMA standards for strength and minimum pole mounting requirements. The minimum pole space advantage makes these supports particularly desirable for joint-use poles.

Complete Line of Luminaires and Supports

L-M supports are available in lengths up to 20 feet, in steel or aluminum. L-M also offers a full line of street lighting luminaires—incandescent, mercury vapor, and fluorescent—and complete street lighting application engineering service. Ask the L-M Field Engineer for information and bulletins. Or write Line Material Industries, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.



Support for guy rods is welded to the bracket. This reduces the number of parts, adds strength to the bracket, and minimizes vibration.

Nuts and threaded parts are covered with a plastic protective coating. Brace is firmly strapped to the bracket to facilitate shipping, handling, and storage.

4 Each L-M luminaire support is identified with an easy-to-read label which lists the catalog number and illustrates the mounting, length, and rise dimensions.

When ordering lighting equipment, protect yourself. Insist on quality products that meet the exacting requirements of EEI-NEMA standards (Edison Electric Institute and National Electrical Manufacturers Association).

LINE MATERIAL Industries
McGRAW-EDISON COMPANY

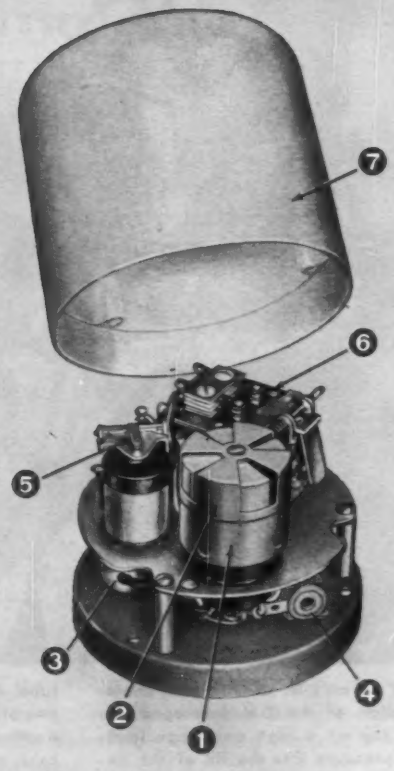
269R-2

Outdoor Lighting

McGRAW EDISON

DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS • POWER SWITCHING EQUIPMENT
PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING • LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

L-M'S NEW cadmium-sulphide photoelectric control fits standard EEI-NEMA heads with Twist Lock® receptacle or adapter available for straight prong sockets. Reliable research reports indicate that hermetically sealed cell assures long life—with contact life of 15 years or more. Factory setting 1 to 1½ footcandles; adjustable from ½ to 6 footcandles.



COMPONENT PARTS: (1) cadmium-sulphide photocell with broad active surface; (2) adjustable louver; (3) capacitor; (4) selenium rectifier—improves pilot relay action; (5) pilot relay, d-c type; (6) load relay with non-integrating time delay; (7) Tenite® II plastic housing, 4 x 4 inches. Other components, not visible, are resistor; lightning arrester, 3-prong locking-type plug—holds control firmly on head.

New L-M Tubeless Cadmium-Sulphide Photo Control—Dependable, Economical

Conservative operation of all components, and even light distribution over photocell's active surface, provide maximum life, trouble-free service.

L-M announces a new tubeless photoelectric control for incandescent, fluorescent, and mercury vapor outdoor lighting. The new unit, built by Tabet, achieves long life and reliable, economical operation by effective use of a new cadmium-sulphide photocell connected directly to a d-c pilot relay. The cell provides enough current to operate the relay with as little as one-half footcandle, without amplifying tubes or transistors.

The photoconductive-type photocell has a broad active surface and is hermetically sealed for stability. A unique adjustable louver spreads the light evenly over the entire active surface of the cell to insure long unit life. The plastic housing provides additional diffusion. The result is a control that is so economical, and requires so little maintenance, that it is practical to use a control on each luminaire.

Built-in Time Delay

The new Cd-S control uses magnetic pilot and load relays. The load relay provides positive non-integrating 5-second time delay, which eliminates transient operation by lightning flashes or traffic. Contacts are rated 1000 watts. The pilot relay is a time-proved d-c type which operates on low current.

Get Details From L-M

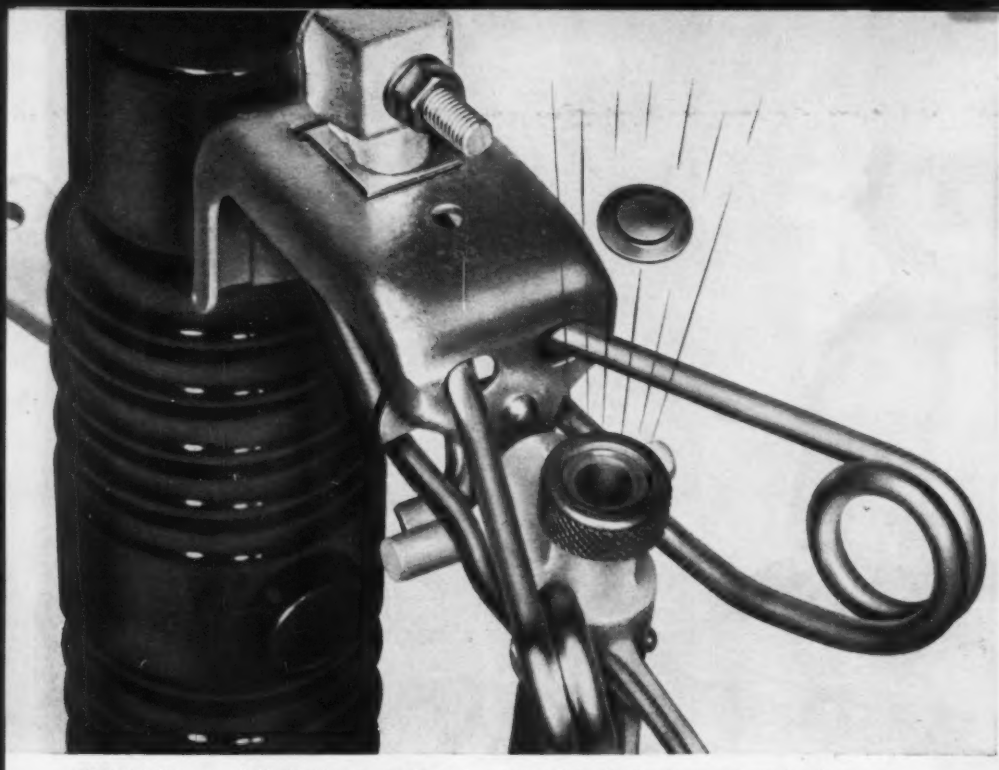
Ask the L-M field engineer or lighting engineer for more information on the many advantages of these new L-M cadmium-sulphide photoelectric controls. Or write for bulletin to Line Material Industries, Lighting Division, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

LINE MATERIAL Industries Outdoor Lighting

McGRAW-EDISON COMPANY

DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS
POWER SWITCHING EQUIPMENT • PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING
LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

McGRAW EDISON



TOP VIEW of an L-M HDO cutout, showing operation of the L-M-developed expendable cap on a high amperage fault. The high pressure lifts the lid of the expendable cap, rather than bursting the fuse tube. Actually the cap very rarely blows—one utility says in 2% of the cases at most; another has never had it happen. In any case, most utilities agree that the expendable cap provides good, low-cost insurance.

How It Works

On low amperage faults, the tube provides ample pressure for fast arc expulsion by single-venting at the bottom of the cutout.

On high amperage faults, the cap at the top opens instantly, releasing the pressure by venting at both ends of tube.

L-M Cap Secret Of Economical Extra-Duty Open-Type Cutouts

L-M's development of the expendable cap principle in 1950 solved the problem of handling both high and low amperage faults in open-type cutouts. Thus it is possible to produce a cutout that performs well at all values of current up to the "extra-heavy-duty" ratings. On low amperage faults, the small-bore tube develops ample pressure to expel the arc. On high amperage faults, the pressure opens the lid of the cap, releasing the pressure instantly without danger of tube rupture. While this seldom happens, in perhaps one to two percent of the operations—the cap is there, and performs when needed. Thus the L-M cap provides low-cost insurance.

L-M Now Licensing Other Manufacturers

Since this L-M invention is the only practical solution to the problem that has been found, L-M is now licensing other manufacturers to use the L-M expendable cap. So when you buy open-type cutouts—of *any* make—look for the expendable cap that economically provides for successful interruption of all current values. These caps are standard on L-M HDO open-type cutouts—the outstanding and original controlled, double-vented cutout.

Don't Flip Your Lid—Let the Cutout Do It

True—it's rare that you need the extremely high interrupting capacity the expendable cap provides. But it's there when you need it—and the cap eliminates the danger of bursting fuse tubes. Get complete information on L-M Type HDO open cutouts from your L-M Field Engineer; or write for HDO Bulletin to Line Material Industries, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

Some L-M Cutout "Firsts"

L-M has been the outstanding leader in the development of fuse cutouts. Here are some well-known L-M "Firsts."

1. First wet-process porcelain box, replacing wood boxes.

2. First formed-section fuse links, giving better accuracy—now used by most link manufacturers.

3. First dropout cutouts—with tube dropping to indicate a blown fuse.

4. First phenolic-covered fibre tubes. Covering prevents warping.

5. First open-type fuse cutout.

6. First repeater cutouts (open and enclosed) to help maintain service continuity.

7. First bi-metal fuse links, providing better fusing (high surge) characteristics than the single metal links previously used.

8. First "heavy-duty" porcelain-housed cutouts.

9. First "extra-heavy-duty" porcelain-housed cutouts.

10. First complete porcelain-housed cutout family with interchangeable doors to meet changes in system requirements.

11. First link-break type, load-current-interrupting cutout.

12. First controlled double-vented open-type cutouts, made possible by the L-M development of the expendable cap—now available by license agreement to other companies, as are many other of these L-M "Firsts."

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

fuse cutouts and fuse links

McGRAW EDISON

DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS
POWER SWITCHING EQUIPMENT • PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING
LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

Editorial Comment

SEPTEMBER 29, 1958

To AIEE Members and Fellows (Only)

Your Board of Directors with the able assistance of a committee composed of Messrs. E. B. Robertson, chairman, T. M. Linville, and W. J. Barrett, has been promoting a "Functional Plan" to provide greater unity of the engineering profession. Primarily, this plan covers a specific allocation of responsibility among the three groups, Engineers Council for Professional Development, Engineers Joint Council, and the National Society of Professional Engineers.

It is the opinion of the committee that the success of the "Functional Plan" depends to some substantial degree upon the universal recognition of the N.S.P.E. as the spokesman for the profession in "professional" matters. However, in order to achieve this objective, N.S.P.E. should, they believe, represent a much larger segment of the engineering profession. Therefore, AIEE has proposed to N.S.P.E. that for a period of time they admit to their membership Members and Fellows of the Institute regardless of their status as Registered Engineers.

To assist in further discussion of this proposal, the AIEE Board is now circulating a questionnaire to determine the interest among the members in N.S.P.E.

In the questionnaire they ask the question—Would you join N.S.P.E. if AIEE Members and Fellows were eligible for membership even though not Registered Professional Engineers? (Membership dues about $24 per year.)

The AIEE Board needs this information in order to receive guidance in its efforts toward promoting greater unity of the profession. We urge all Members and Fellows to return the questionnaire promptly.

"Electric Living" Is Up to You

Within the next 30 days, electric light and power company members of Edison Electric Institute will be asked to commit a total of nearly $2.8 million to initiate the national all-electric promotion program. There are a number of good, solid reasons why individual companies will want to support this program.

First, their contributions will help furnish the utility leadership that has been noticeably lacking in a national program. Gas utilities have been carrying on such programs for more than a decade.

Second, these contributions will enable utilities to tell their story in places and in ways that only the largest companies would be able to do otherwise.

Third, the relatively modest $2.8 million put up by utilities is almost certain to attract another $8 million to $10 million worth of integrated and tie-in advertising from manufacturers and other trade allies.

Fourth, the program has the potential of creating the atmosphere and the desire for all-electric living in a wholesome manner and on a higher plane than would be possible with smaller, more restricted programs.

There are other good reasons for the all-out support of this program, but these should indicate that the funds contributed could well be one of your best investments in sales promotion in many a year—and a needed supplement to your local sales activities.

Balloting to Decide Splurge of System

Modernization needs are a big factor in power company dickering with co-ops and municipalities. Competitive element enters into hassles involving three cities

The aftermath of a crushing snow storm, difficulties in financing needed modernization, and the lure of reduced rates for electricity are a few of the reasons behind a recent flurry of plans and proposals for changes in ownership of power systems scattered throughout the U. S.

In New Jersey, for example, the storm-battered Tri-County Rural Electric Co, Inc, one of two cooperatives in the state, is due to vote soon on an offer by Jersey Central Power & Light Co to buy the system. The offer, which came after a vote by the co-op's members authorized the board to seek a Jersey Central proposal, involves $917,000.

Jersey Central has placed the money in escrow pending action on the offer. The proposal needs a two-third majority of Tri-County's shareholder-customers plus approval by the state Public Utility Commission.

If the co-op endorses the plan, members will receive equity payments of $76,000; long-term debt to the Rural Electrification Administration of $806,714 will be settled; Tri-County's short-term borrowing of $31,000 to meet expenses from a snow storm last March will be paid; and $3,285 would handle the loan's accrued interest.

Rates Cut of $46,800 Seen

Rates for the co-op customers would be lowered by at least $46,800 a year, Jersey Central estimates. The offer includes plans for system improvements, job offers for all Tri-County employees, and other steps to insure service reliability.

Tri-County serves 2,400 customers with 378 mi of lines in four New Jersey counties. Its books show an adjusted net equity of $25,020 for members.

In Indiana, the Ft. Wayne Municipal Light & Power Works has turned to a consulting firm for help on problems stemming from a competitive situation with Indiana & Michigan Electric Co, the need to modernize facilities, and a wage demand from employees.

The municipal utility said it would petition the state Public Service Commission for a rate increase if I&M would ask for a similar hike. R. E. Doyle, Jr, vice president and general manager, said the company plans no rate change, however.

$10 Million Modernization Needed

The Light & Power Works needs nearly $10 million for additions to its plant in the next ten years, according to Superintendent Fred Feustel. It buys between 22% and 23% of its power today from I&M for about 9.5 mills per kwhr, while the city's plant produces for about 7 mills per kwhr, he said. Competition between the utilities has kept I&M rates lower in Ft. Wayne than in any other area served by the company, Feustel said.

The consulting firm hired by the city utility will study the cost of improvements required by the system; advisability of shutting down the plant and purchasing energy; continued operation of present generating facilities and purchase of all needed additional power; construction of a new generating plant but continued purchase of part of the utility's total requirements; and sale or lease of all the municipal system's facilities.

Meanwhile, I&M will acquire the Decatur, Ind., Light & Power Department for $2,102,300 if voters approve the offer at a referendum coming up soon. Both the company and the city favored the vote plan.

Unless Decatur sells its plant, it will have to spend some $1 million for modernization. I&M's purchase price includes the city's distribution system but excludes the generating plant building. The company plans major construction amounting to $1.4 million if the sale is consummated, said J. Calvin Hill, Ft. Wayne division manager.

Voters of Springfield, Ore., where a municipal electric system has been competing with service of Pacific Power & Light Co, will vote Nov. 4 on a $3.5-million revenue bond issue for purchase of PP&L facilities.

Decision of the Springfield city council to put the issue to voters resulted in suspension of hearings Oregon Public Utility Commissioner Howard Morgan had scheduled on the controversy between the two systems in which each had charged the other with illegal competition.

The city's utility board has indicated it views $2,850,000, which is 4¼ times PP&L's Springfield area annual revenue, as a "reasonable maximum figure" for purchase of the company's facilities, with $650,000 budgeted for tying the duplicating systems together and removing unneeded poles if the bond issue carries and PP&L property is sold.

Two Ohio Towns to Vote

Nov. 4 also will find two Ohio cities voting on power system matters. Greenfield voters will determine whether the village should buy power at wholesale, expand the municipal plant and continue in the utility business; or sell the plant and distribution system. The three issues are being submitted through initiative petitions.

Greenfield sent invitations to make an offer to Dayton Power & Light Co, Columbus & Southern Ohio Electric Co, and Inter-County Rural Electric Cooperative of Hillsboro. DP&L engineers currently are conducting a survey. Columbus & Southern, in a letter to Mayor Robert J. Smith, declined the invitation. Greenfield serves about 2,400 meters and operates a 3,500-kw steam plant.

Voters at Miamisburg, Ohio will decide whether or not to sell the municipal plant to a private firm.

An offer by Arizona Public Service Co to buy the Verde Electric Cooperative, Inc, was defeated in a vote of the total membership, although those present at the meeting favored the sale by 239 to 115. The company offered $600,000 for the distribution system, which serves some 410 customers; a rate cut of 25%; an investment of $50,000 dur-

Acquisition Proposals

ing the first year to up-date the system; and to pay all outstanding indebtedness. The offer was the result of a petition signed by dissatisfied co-op members. Said PS Pres Walter T. Lucking: "We feel this vote was a tremendous expression of confidence in our company, considering that the members voted more than two to one to sell the system. . . . The proposal was defeated by the absentee members which, in effect, counted as 'no' votes."

Princeton, Ky., has laid the groundwork for the purchase of Kentucky Utilities Co facilities within the city. The small (5,500 pop) city plans to begin buying and distributing Tennessee Valley Authority power, possibly within 18 months.

The Princeton council reaffirmed an earlier unanimous vote to notify the power company of the city's intent under terms of Kentucky's TVA Enabling Act. Passed in the early Forties, the act requires a privately owned utility to sell to a municipality which desires to buy, and prescribes the procedure to be followed in such a purchase.

Last Monday the switch was thrown to send TVA power into the distribution system of Covington, Tenn. The TVA power replaces an output of 8,320 kw produced by plants of the municipality. Mayor William A. Shoaf said the conversion would bring savings of $70,000 in the next year for the 1,800 users of power in the city.

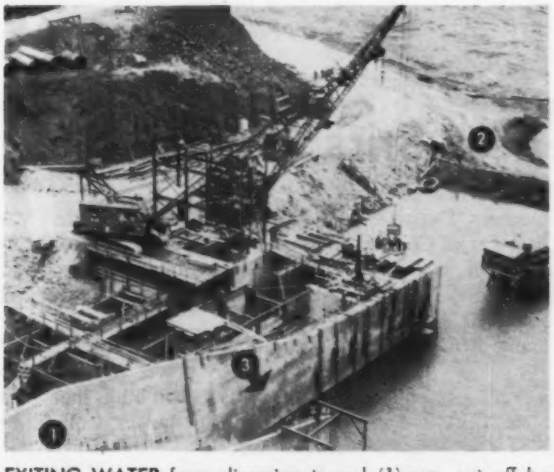
Officials of Arkansas City, Kan., were told by Kansas Gas & Electric Co that it would not agree to the city's plan to buy the company's distribution system and service customers with power purchased at wholesale from KG&E.

Howard D. Smith, the company's division manager for the area, said, "City officials should not expect us to help them acquire our property by agreeing to continue to dedicate millions of dollars of property to serve one wholesale account."

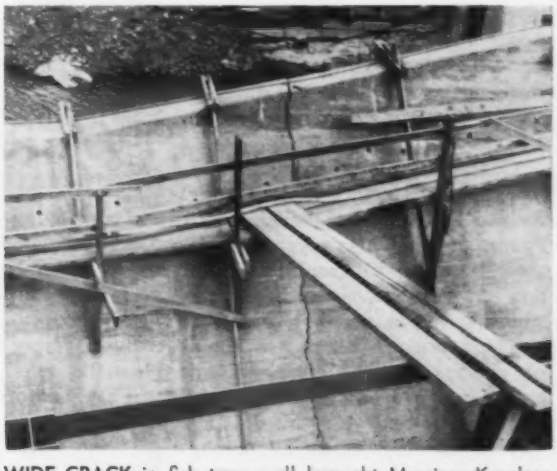
The city's proposal, based on a franchise clause reserving purchase rights, would provide KG&E an estimated $1 to $1.5 million. The current franchise runs to 1960 and calls for payment to the city of 2% of the company's gross sales. KG&E has proposed a new franchise which would provide 3% of gross, or about $21,000 a year.

It would cost Arkansas City about $6 million to build a steam plant that would meet present needs, Smith said. KG&E cannot agree to sell wholesale power to the city, even if the local system changes hands, he added.

In Wisconsin the Public Service Commission is studying a preliminary proposal by Wisconsin Public Service Corp to acquire the Eagle River municipal system. An inventory and property appraisal is being taken before the city takes the offer into consideration. Eagle River serves about 700 meters and last year purchased 2.5 million kwhr.



EXITING WATER from diversion tunnel (1) was cut off by cofferdam (2) so trap wall foundation could be bolstered



WIDE CRACK in fish trap wall brought Morrison-Knudsen workers on the double. Salmon were not harmed, says IPC

Fish Trap Repair Embroils Idaho Power

Idaho Power Co is continuing to generate electricity at its Brownlee Dam on the Snake River, after the company successfully weathered two complaints last week against its activities at Brownlee and Oxbow sites.

The complaints—both from conservationists—were: **1.** That Idaho Power had not conducted sufficient studies for protection of migratory fish at Brownlee and Oxbow, as called for in its license. **2.** That Idaho Power had illegally halted the Snake River flow at the two dams, thereby killing a number of fish downstream.

Separate hearings were held on the charges; one before Gov Robert

D. Holmes (and television cameras) Sept. 16 in Salem, Ore., and the other behind closed doors Sept. 18 at the Federal Power Commission.

At the staff conference in Washington, the company agreed to spend an additional $71,000 for fish studies, and the FPC agreed to extend the company's temporary generating license at Brownlee until Oct. 1. By that time, all fish traps at the dam are expected to be operating, and a permanent go-ahead probably will be issued.

Because of high Snake River flows, the FPC gave Idaho Power temporary permits to operate its completed Brownlee unit from Sept. 5 to 15 and from Sept. 16 to 19, instead of releasing the water over the spillway. Although the company had not completed its fish traps at that time, the net barriers were in place, and conservationists agreed to the permits.

Adequate Studies Undertaken

However, Oregon and Idaho conservation boards and the U. S. Fish & Wildlife Service called on the power company to speed up and expand its studies on migratory fish problems at the dams. Idaho Power argued that it already had undertaken adequate studies, that additional research would be carried on as needed, and that the company already had spent $250,000 on such studies required by section 34 of its FPC license.

Conservationists then challenged the company's method of accounting for fish studies against the $250,000 figure, and they also suggested that the FPC suspend Brownlee's temporary generating permit until adequate studies were completed.

The hearing in Salem was based on charges that the company had cut off the Snake River flow entirely at Brownlee and Oxbow for about 12 hours on Aug. 31, thereby killing a number of salmon and obstructing downstream navigation. The company testified, however, that the flow was cut only to 2,000 cu ft per sec (with FPC and Army Engineers approval) in order to make emergency repairs at a concrete fish trap below the diversion tunnel at Oxbow, which the heavy Snake flow had undermined for nearly 50 feet.

The complaint was dropped after no evidence was produced that any fish had been killed.

Computer Data Swap Urged

Manufacturers and utilities in the electrical industry should jointly set up a clearing house for the free exchange of programs for digital computers.

This recommendation was made by J. K. Dillard, manager, electric utility engineering department, Westinghouse Electric Corp, in the belief "that maximum benefit to the industry can be obtained by establishing an organization for free exchange of programs among various segments of the industry." He suggested the clearing house might be administered by an association already serving the industry, such as Edison Electric Institute.

To get the clearing-house program started, Dillard stated Westinghouse will in the immediate future make available for use by others eight programs for solving power system problems on the IBM 704 computing system. The programs will cover these problem areas: Self and mutual drop coefficients; loss formulas; economic dispatch; I^2R losses; load flow; short circuit studies; transient stability; and distribution feeder voltage control.

"Sharing our programs will result in advantages to all parties involved," said E. L. Harder, director of Westinghouse's analytical department in East Pittsburgh. Development of programs such as those to be shared with the industry costs from $20,000 to $50,000 and takes from one to three man-years. "For each computer user to develop the same programs obviously would be impractical and a needless waste of money and time," Harder pointed out.

In the interim period while such a clearing house is being set up, Westinghouse will make the programs available to utilities that have gained familiarity with their use at the East Pittsburgh facilities. Release of the eight programs and any additional programs, or establishment of the proposed computer program clearing house, will not change Westinghouse's present service to customers who use the East Pittsburgh facilities. For those users who want assistance in using the released programs independently, a consulting service at a nominal fee will be provided.

TVA Report Stirs Controversy

The Natural Resources Department of the U. S. Chamber of Commerce doesn't spend all of its time on matters tied directly to the Tennessee Valley Authority. It just seems that way to many of the people in the area.

TVA and its backers presently are perturbed over the CofC's department's booklet, "TVA: What's Next?" So far about 150 copies have gone out—60 to past and present members of the committee who worked on the report and the rest to wire services and the "natural resources trade press." In addition about 300 copies have been sold.

The booklet provides the results of a study on which the Chamber has based recommendations for:

- Private, and state and local government agencies to buy and operate TVA's power facilities.
- Army engineers to operate TVA dams and the Federal Power Commission to regulate TVA power, "establish new rates to cover all hidden costs."
- Elimination of the sole-supplier clause in TVA power contracts "so that power users can build their own facilities or buy power from non-federal sources."

Protests are growing in Tennessee from city chambers against the parent group's recommendations. The Gallatin CofC has withdrawn from the U. S. chamber because of "murderous attacks" on TVA. Officials of chambers in Knoxville, Memphis, Lebanon and Clarksville voiced strong opposition to the proposal, but haven't seceded.

TVA's board of directors struck sharply in a point-by-point rebuttal of the U. S. chamber's report. The

findings "constitute a misrepresentation of TVA and a disservice to the general public and the members of the U. S. Chamber of Commerce," the directorate said.

The national chamber's booklet is written along lines of the second Hoover Commission study. Most of it was written by Charles Curran, who formerly was with the Budget Bureau and was staff administrator for the Water Resources and Power Task Force of the second Hoover Commission.

Region Girds for Big Push

Meanwhile, concerted effort is building up in the region for an all-out push for the TVA self-financing bill, which the House pigeon-holed in the last session.

Sen Albert Gore said recently in Nashville that one of the first things he will do when Congress convenes will be to introduce a new self-financing bill. Earlier, Clyde Ellis, general manager of the National Rural Electric Cooperative Assn, called for louder vocal insistence from the area in favor of the bill at an NRECA regional meeting (see page 87 also).

TVA's self-financing bill will never pass Congress until the people of the valley become 'so stirred up, the whole country will take notice," Ellis said.

"Ordinary methods will not get the job done when all of Wall Street is trying to destroy the TVA," he told about 3,000 farmers and their wives at the annual meeting of the Gibson County Electric Membership Cooperative.

Stirring Up Needed: Ellis

"First, those who love TVA must get the valley so stirred up that the whole country would have to sit up and take note," he said. Second, that kind of a fuss would bring action from public officials and members of Congress inside and outside the valley. They can't ignore it.

"If you don't really believe that TVA is in real trouble, how can you expect people over the rest of the country to believe it?" Ellis asked.

A Tennessee co-op leader called for a drive to elect pro-TVA congressmen nationally as "the only sensible answer" to defeat of the TVA self-financing bill.

Kansas City P&L Bores Into 161-Kv Job

The 8⅝-in. pipeline laying job just wrapped up by Kansas City Power & Light Co (above) marks the first step in the company's biggest underground transmission line project. Beginning next spring the company will install 2 mi of 161-kv line, making it one of the longest lines of that voltage in the U. S. and "the costliest (more than $1 million) 2 mi of transmission line ever built by Kansas City P&L."

The project brings a h-v supply deep into the congested center of the city for the first time, said Executive Vice President C. F. Monnier. The cross-town tie follows the company's $14.5-million program of converting distribution from 4 to 13.2 kv since the impact of home air conditioning hit in 1954. The three strands of 1.41-in. copper core UG cable will have oil-impregnated insulation, making a 2.86-in. bundle.

U. S. Power Picture

- **Coal price rises for TVA; Lewis aims for $23.45 a day**
- **Grant County PUD scored in report by state examiners**

The price of government-purchased bituminous coal—mostly for Tennessee Valley Authority—has been hiked by 50¢ a ton under a new ruling by Labor Secretary James P. Mitchell.

Using authority of the Walsh-Healey Act to set minimum wages on government contracts above $10,000, Mitchell set a $2.745 an hour rate for most soft coal areas with federal contracts.

This required minimum affects coal producers serving TVA, which buys about 20-million tons out of the total 25 million bought each year by the government. The increase was sought by the United Mine Workers and unionized soft coal producers to prevent non-union mines from underbidding on contracts because of lower pay scales.

At the same time, UMW moved for a new pay hike of $1.20 a day for 180,000 soft coal miners. This would put the rate for its members at $23.45 a day.

Prior to Mitchell's action, TVA Chairman Herbert D. Vogel and Joseph E. Moody, head of Southern Coal Producers Assn, said they were closer to agreement than they've ever been and studies are underway to close the gap even more.

Moody, whose group long has been critical of the agency's coal buying, said changes in procedure have lessened his industry's grievances.

Vogel said procedures under study

include requirements for coal operators' performance bonds, the ratio of coal bought on long-term contracts to spot purchases, and the amount of coal stockpiled.

• Already under investigation by a grand jury at Ephrata, Wash., the Grant County Public Utility District was sharply criticized by examiners for State Auditor Cliff Yelle, in a report released Sept. 19.

An 80-page report on the PUD's Priest Rapids Dam project pointed out that the Grant County treasurer has been bypassed in handling proceeds of a $166 million bond issue sold to finance the project. Instead, the proceeds are being handled by an out-of-state trustee. At the end of 1957, $124.5 million in PUD cash and investments did not appear on the county treasurer's books, the report set forth. These practices are declared to be contrary to state law.

The examiners reported that Glenn Smothers, who resigned Aug. 1 as PUD manager, was paid $25,000 last year, making him the highest-paid public official in the state.

A law firm headed by Nat Washington, dismissed in late July as the PUD attorney after Washington brought charges leading to the grand jury investigation, received $70,000 for work connected with the Priest Rapids project during 1952-56 period, the report declared. A New York legal firm got $129,350.

The Washington Wire

• 'Federal power monopoly' concept blasted by Aandahl

Assistant Interior Secretary Fred Aandahl has hit at the establishment of a "federal power monopoly," and called for non-federal power systems —private and public—to develop generating facilities at hydro sites that have very limited possibilities of multi-purpose development. He spoke last week before the Northwest Electric Light & Power Association at Sun Valley, Idaho.

Public and private power systems and "essential" federal multi-purpose projects, should work together, he said. "Advantage should be taken of all reasonable opportunities to build (federal projects) on a cooperative basis with local entities."

The last thing we want in electric power "is a federal power monopoly with local communities depending on the government in Washington for their economic opportunities and the measure of their expansion needs," he said. "Such hydro-electric power as comes from federally constructed generation should be marketed so that, in contributing to the economic strength of the area, it also will be most helpful and least disruptive to local entities, both old and new, that historically and currently have the primary responsibility for power supply and distribution."

Aandahl said, "The multi-purpose dam impetus has carried with it also the federal construction of some hydro-electric projects that have very limited additional purposes than power. Most of these could well be developed by non-federal entities for the purposes of strengthening both the federal treasury and the economic stability and responsibility of the local community."

• The Federal Power Commission has authorized Duke Power Co to build and operate a new 350,000-kw hydro power plant (Cowan's Ford) on the Catawba River, N. C., and simultaneously placed Duke's ten other existing power facilities on the Catawba-Wateree River system in North and South Carolina under the same 50-year license.

The new Cowan's Ford Dam will have an initial capacity of 262,500 kw, costing an estimated $46,088,000. Its ultimate 350,000-kw capacity will cost an additional $4,780,000.

In granting the single 50-year license for all 11 power dams, the FPC pointed to "the desirability of having the license expire at the same time with respect to all of the project works" in a particular basin. The previous ten power dams were built between 1905 and 1928.

• Power-head development will be 85% after Cowan Ford is completed.

Rates and Regulation

• Increase of $7,893,000 sought by Union Electric
• Tax loophole closed

Union Electric Co has filed applications with Missouri Public Service Commission, Illinois Commerce Commission and municipalities in Iowa asking for rate increases totaling $7,893,000 a year. A revised tariff covering sales to other utilities is to be filed with the Federal Power Commission. The increase would net the company about $3.6 million. The other $4.3 million would go for taxes.

The increase is necessary, Pres J. W. McAfee said, because inflated costs have caused earnings to fall to a level which does not afford a fair return to the company and its investors.

• A Supreme Court decision in Buffalo recently has closed a loophole through which industries could escape payment of the utility tax.

The decision resulted from an appeal by the Allied Chemical Corp on a determination that industrial users and consumers are subject to utility taxes whether the utilities are used for domestic, industrial or commercial purposes.

The city enacted a local law in 1956 authorizing it to collect 3% of the charge for the consumption or use of gas, electricity, refrigeration or steam for domestic or commercial use.

Allied Chemical asked for a refund of $22,312.20 covering the period from July 1, 1954 to May 18, 1956.

PLAN '59

HOW MANY . . .

old meters can you retain in modernizing your system?
See the October 20 issue.

Multi-Hued Lamps Inspire Light Fete

Seven-hundred and forty-two floodlights are casting a new, multi-colored light on Grand Coulee Dam. The wide-beam, 1,500-w lamps splash white, yellow, red, blue and green on the project's central spillway. The system provides a 30-min display during which color changes occur every 12½ sec.

When the floodlighting job was dedicated ("one of the splendors of the North American continent," said Interior Secretary Fred Seaton), a "Festival of Light" attracted 25,000 people. The colorful event will be staged each year.

The floodlighting pulls about 1,250 kw to provide a 3.8 ft-c level on the spillway. General Electric Co equipment was used throughout.

KING-SIZE BANK of floods, 90 x 20 ft, requires 1,250 kw to light dam

Atomic Progress

• Political snag looms on gas-cooled reactor proposals

A major political squabble may grow from proposals to build a gas-cooled power reactor under the Atomic Energy Commission's power demonstration program.

AEC Chairman John A. McCone last week invited proposals for the development, design, construction and operation of a gas-cooled, graphite-moderated power plant. Proposals must be submitted by Nov. 21.

According to industry reports, proposals will be submitted by one or more investor-owned utility-manufacturer combinations and the Tennessee Valley Authority.

Congress this year passed legislation authorizing federal construction of a gas-cooled power reactor unless acceptable proposals are received under the power reactor demonstration program within 30 days after enactment of appropriations for the project.

McCone's announcement, which beat the deadline by five days, comes after behind-the-scenes conversations at which private utility representatives spoke out against any move to limit proposals to the design submitted to AEC by Kaiser-ACF Industries earlier this year.

Representatives of the Joint Committee on Atomic Energy, on the other hand, urged that public and cooperative utilities be made clearly eligible to submit proposals.

Both groups apparently succeeded.

AEC says the plant must be of "sufficient size to serve as an effective prototype for a future full-scale power plant of similar design." Then the commission announcement hints broadly that a reactor in the 30 to 60-Mw range would satisfy this requirement. Congressional talk has centered around a 40-Mw reactor costing $51-million.

It is not clear how far from the Kaiser-ACF design the proposals may stray, but AEC says proposals "may incorporate reactor designs and further development considered by the proposers to be appropriate and desirable, provided the proposed reactor be designed to operate with an exit gas temperature of at least 1,000 F and reactor construction be completed not later than Dec. 31, 1962."

Copies of gas-cooled reactor designs made by Kaiser-ACF and by the Oak Ridge laboratory are available from AEC upon request.

As to who is eligible, AEC says "Proposals may be from individual organizations or groups of organizations representing privately, publicly or cooperatively-owned power groups, and from equipment manufacturers or others."

Criteria for acceptance of a proposal include the probable contribution of the project toward demonstrating the technical and economic feasibility of large-scale power plants incorporating similar designs; cost to the commission in funds, materials and services, and the financial and technical competence of the proposer.

Types of assistance which will be available from the commission include waiver of use charges for source and special nuclear materials up to an agreed upon point, free or cut-rate performance in AEC laboratories of mutually agreed-upon research and development, plus R & D contracts for specific problems connected with design and construction of the reactor.

It is understood that at least three manufacturers are discussing possible proposals with utilities—and that TVA is feverishly preparing to submit a proposal of its own, probably the Oak Ridge design.

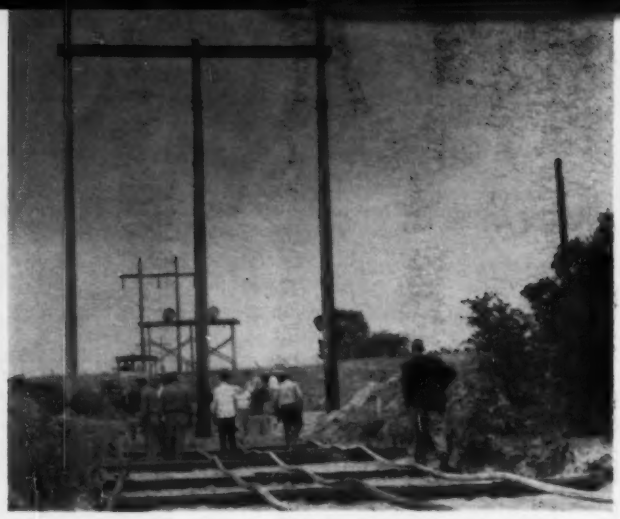
Pressure Predicted

Some spokesmen for private utilities, while sure that industry will submit one or more proposals, predict Democratic Congressional pressure to rule out any design straying too far from the Kaiser-ACF study.

"No utility can afford to build a plant at close to $1,500 per kwh," says one. "So proposals are likely to be for plants costing $35-million or less."

On the other hand, there's a question in industry circles whether TVA can qualify without going to Congress for special legislation and special appropriations. This, too, would run into opposition.

CABLE ENDS were pulled ashore over a series of floats which positioned cables above trench on New York side



ON SHORE, the cable ends were pulled up to the New York side terminal structures by means of lines and a winch

Four 9,000-Ft Oil-filled Cables

Four 9,000-ft, oil-filled paper cables were laid recently across Lake Champlain to connect the transmission systems of the Power Authority of the State of New York and the Vermont Electric Power Co. The cables are the longest ever manufactured in this country.

The 115-kv submarine cables now extend from Cumberland Head, N. Y., across the narrows to Gordon's Landing on Grand Isle, Vt. There they will connect to the Vermont system for transmission and distribution throughout the state.

The power originates at the St. Lawrence Power Project at Barnhart Island, Massena, N. Y. It is transmitted over a 230-kv line to Plattsburg, N. Y., where it is stepped down and then transmitted at 115 kv to Cumberland Head.

Before the cable laying, the barge carrying four reels was anchored close to the New York terminal. Cable ends were pulled ashore over a series of floats which positioned them above a trench. Once on shore, they were pulled up to the terminal structures.

Before the pulling, small reel oil reservoirs for maintaining pressure during shipment were disconnected, and the cable ends were sealed. When the cables had been placed, two batteries of oil-feed reservoirs were attached to maintain the positive oil pressure established when the cable was impregnated at its New Jersey factory. The second battery was a safety precaution for use in the event that the expansion of the cable required more oil. The main battery will be made permanent when the installation is completed.

IN LAYING CABLE, the barge was towed by two tugs, and once under way it took only 1½ hr to reach the Vermont side. The 500-MCM cable weighed about 63 tons per reel, and the total shipment on the barge more than 500,000 lb

TWO BATTERIES of oil-feed reservoirs were attached at the Okonite factory to maintain the set positive oil pressure

STEEL ARMOR was removed from cable sections that were to be buried to reduce heating caused by induced currents

Link States Across Champlain

The shore ends, which were buried directly in the earth at both ends, have the jute and armor replaced by an 0.078-in. thickness of reinforced Neoprene. Steel armor was removed from sections to be buried to reduce heating from induced currents. Lake water will cool underwater sections.

During laying, the barge was towed by two tugs which took only 1½ hr to reach the Vermont side, where it was moored just off shore. The remaining cable was unwound from the reels and laid in figure "eights" on the deck. The cable ends were pulled to shore and then to the Vermont terminal structure by means of lines and a winch.

In the final operation there could be no substitute for manpower, as the figure "eights" had to be eased into the water, one by one, so that the cables could be pulled ashore without kinking.

During the laying, a pioneer experiment was made with closed-circuit television. An underwater camera, such as is used to check the facing of power dams, was lowered along with the cables in an effort to determine their lake-bottom position. This experiment led to the feeling that stronger light sources, some modifications of the lenses, and better control of the lowering apparatus would be necessary for such equipment to give a satisfactory picture, especially at depths where divers could not be employed.

Earlier skin divers had examined the trenches at the shore ends and then checked cable positions after the laying.

WINCH pulled the lines attached to the cable ends in bringing the cables ashore and up to structure on Vermont side

ONLY MANPOWER could be used for laying cable in figure "8's" and then easing them into the water without kinking

Power Is Theme as Two

Hydro, thermal, atomic sources discussed by World Power Conference (Montreal), Large Dam Commission (New York) and delegates from 'round the world picture generation, transmission needs and situations in their own homelands

The World Power Conference and the International Commission on Large Dams, meeting recently in Montreal and New York respectively, stressed these trends in the power field on a global scale:

1. Hydroelectric power is being pushed for enlarged output as fossil fuel resources are found to be dwindling.

2. The prospect of lessening fuel supplies is stimulating interest in nuclear fuels.

3. Plans for the large-scale cultivation of hydro remote from utilization areas are prompting decisions to boost transmission voltages.

4. To obtain more power from available dams, many countries are raising dams higher for the impoundment of more water.

5. Linked with the hydro development is an active interest in economic extenders for cement in concrete dams.

Practically unlimited possibilities for increasing the production of hydroelectric power are available to Russia in its enormous Siberian rivers, the conference was told by A. N. Voznesenski and A. A. Beschinski. Russian water power resources are now estimated at 420,000 Mw on an average yearly basis or 3,680 billion kwhr of average generation yearly (theoretical gross potential).

But Siberia has not only the richest and most economical water power resources in the USSR, but also vast amounts of coal that may be strip-mined at low cost. Thus Siberia is the scene of both hydro and steam station construction on a large scale.

There a huge storage basin has been formed, a new station is in operation, and construction is continuing at two stations of 3,600 and 4,000-Mw capacity, each. And with the large-scale exploitation of Siberian power resources, transmission of large blocks of power to the Urals and the west becomes more feasible. Transmission lines up to 1,650 miles, with a capacity of nearly 5,000 Mw, will be required. This line may be constructed for ac at 600 to 700 kv, for dc, or on the basis of a combined scheme (dc through lines and an ac circuit for intermediate substations).

L. O. Saatchjan and G. N. Lyalik pointed out that large steam stations, in systems with hydro stations, will be built near the rich coal fields in Central Siberia.

Describe Bersimis

D. M. Farnham and J. R. Hango, Quebec Hydro-Electric Commission, gave the rationale for the water power development of the Bersimis River about 237 miles from Quebec and 387 miles from Montreal. To meet impending power shortages, this development was scheduled for first delivery in the fall of 1956.

Transmission from the Bersimis River development is at 287 kv, a system at this voltage having been considered more reliable and less costly than one at a higher voltage. On it, the use of series capacitors was deferred. This choice of a transmission system, with a maximum operating voltage of 315 kv, while challenging many recent studies, was considered sound in the circumstances, as the use of double-circuit lines up to practical limits can effect substantial savings in line and right-of-way costs. The same type of transmission will be used for Bersimis No. 2, now under construction.

Total coal reserves of Canada, as reported by C. L. O'Brien, Dominion Coal Board, are some 89,600,000,000 tons, or 6,500 years supply at present consumption rates. But the economics of coal production are subject to Canadian geographic factors that override the presence of ample reserves.

Nova Scotia mining output has declined chiefly because of difficulty in working the underwater mines. The faces of the larger producing mines in the Sydney area are 2 or 3 miles from shore, and those on the mainland have exhausted the easily won reserves, the remaining coal being difficult and costly to mine.

But, in the last few years, Western Canada has experienced spectacular findings and development of oil and gas fields which are considered only forerunners of more extensive discoveries. And in Saskatchewan, a healthy lignite industry produced 2,034,000 tons in 1957, in circumstances readily amenable to strip mining.

Increasing the efficiency of established Canadian water power facilities involved Ontario in a water storage scheme at Sir Adam Beck No. 2 plant on the Niagara River. Such storage, according to M. Ward, Hydro-Electric Power Commission of Ontario, would firm up the load factor of thermal plants in the system during summer day-night variation in generation. It would also permit the Sir Adam Beck plants to operate at full capacity at system peak demand in all months without previously building up the forebay elevation to permit full gate operation at peak. Forebay build-up would bring loss of capacity before peak demand, unless a structure was built to control the Niagara's flow completely, and would result in irrecoverable loss of water over the Falls.

International Groups Meet

It was found that eight pump-turbine units would afford a pumping rate of 25,000 cfs for a range in pumping head of 60 to 85 ft. These units, operated as pumps, can lift about 16,000 acre-ft of water from the forebay into the reservoir in 7 hr. The units have adjustable blades and diagonal flow, the ability to vary blade angle permitting selection of a wide range of powers or discharges under various head conditions, all at relatively high efficiencies.

Integration of gas turbine plants in hydro systems, according to T. Ingledow, British Columbia Electric Co and B. C. Engineering Co, frequently leads to substantial economic gains, even where thermal power is relatively expensive. Secondary hydro energy can be firmed up economically by a relatively smaller amount of supplementary thermal energy, thus raising the dependable energy capability of the combined system above that of the hydro system alone. Gas turbine plants, he argued, are more economical than steam plants for this service.

Although the total capital cost of remote and supervisory controls on the Calgary Power's hydro system is $818,500, these additions have reduced operating costs by 32.4%, according to T. D. Stanley and C. F. Green. The latter is with British Columbia Electric Co. In thermal plants, the gas turbine, they noted, is more readily adaptable to remote control.

Early Montreal sessions of the conference indicated that today's engineering thinking places a premium on flexible hydro plants that can store water during low-load hours and pick up load quickly to meet system peaks and emergencies. Pumped storage plants, operating on daily, weekly, or even seasonal cycles, assumed considerable importance.

Use of large capacity in low-load-factor hydro plants for generating energy to save on fuel during high river flow was seen to be of considerable significance in areas of high fuel costs. The importance of this factor will increase as fuel costs rise higher through inflation, seemed to be the meeting's consensus.

Pure pumped storage installations in Europe usually contain a combined motor-generator driving separate pump and turbine units. Switzerland, for instance, has multistage pumps used as turbines. The Western Hemisphere tendency is to combine the pump and turbine in a single machine, most of these machines containing Francis type runners. But, as noted above, the latest development of pumped storage at Niagara contains units with adjustable blades, known as Deriaz turbines.

Burn Anthracite Dust

The USSR has gone far in the use of unusual and low grade fuels in its power stations, has studied the characteristics of such fuels, and has developed furnaces, boilers, burners, and mills suited to their use. The latter equipment is giving good results, and 30 large power stations today burn anthracite dust. More than 40% of the total power generated in Russia is from the combustion of lignites, peat and bituminous shales. Some of these fuels have a moisture content up to 55%, and some an ash content of (dry product) up to 60%.

Coal remains a critical problem to the British. But great strides in coal face mechanization have stemmed from Britain's necessity to satisfy the rising demand for fuel and to reduce the costs of its production. It has also become important to replace men by machines in this time of declining manpower. H. A. Longden, National Coal Board, presented these facts.

High-capacity EHV transmission lines are beginning to offer serious competition to the US railroads as a long-distance carrier of energy, according to J. J. Dillard and Miles Maxwell, Westinghouse Electric Corp. Natural gas and oil, they noted, is likely to become less important as energy sources for electric power, if present price trends are an indication.

All these factors favor the use of high-voltage transmission, although a transmission voltage of 500 kv will not be economical until about 1,000 Mw can be transmitted. As the siting of nuclear power plants will be governed by safety considerations and the need of waste disposal, they are likely nevertheless to be located in about the same proximity to load as steam plants today. Thus nuclear power development, in all probability, will not alter present American transmission practices.

This situation is in contradiction to the position of transmission in other parts of the world. There the principal sources of power are hydro, situated at considerable dis-

SIR HAROLD HARTLEY, Great Britain, was honorary chairman of International Executive Council, WPC. Others are H. A. Ahmed, UAR, W. A. Dexheimer, US

POWER EXPERTS from most of the world's nations gathered at Montreal for discussion of generation and transmission in light of newest technologies

tance from load centers, so that the advent of nuclear power, which can be placed nearer the loads, may profoundly affect transmission practices.

In considerations of future voltage levels in the US there will be more emphasis on the mutual benefits of EHV transmission to adjacent interconnected systems. The possibility of using such circuits as direct ties, without transformations, may permit taking advantage of time-belt and sun-travel effects on load peaks, resulting in substantial reduction in area peaks.

Huge Exports Required

To exploit such opportunities, it will be necessary to export power blocks of 1,000 to 5,000 Mw from system to system for distances of 500 to 1,000 miles, according to Dillard and Maxwell. Savings in capital investment for generating capacity should outweigh the increased cost of line losses.

The almost certain industrial development in established load centers and the remoteness of future energy sources from these centers leaves little doubt that long distance power transmission will have an important role in the development of Brazilian power resources, according to A. W. Hyseby, Sao Paulo Light S/A. Initial lines, he said, will have to be built some 186 to 310 miles in length and extended later some 310 to about 520 miles.

Evaluation of losses complicates choice of conductor for these Brazilian lines, the values to be given kwhr and kw losses being dependent upon the characteristics of the particular hydro plant and receiving system. In considering kw losses of a run-of-river hydro plant, where there is practically no storage and a wide seasonal variation of available energy, the receiving area must provide kw capacity for low flow periods. Thus the value of kw losses on the line is small, as replacement capacity at the receiving end must be on hand. Accordingly, capital cost to be assigned for kw losses must be calculated with the lines carrying a load equal to the minimum, low flow, firm capacity of the hydro plant.

The tendency to build transmission lines to load centers with enough capacity to carry all of the generation that can be developed at a hydro site poses another difficulty. Were large loads to develop close to future generation stations, there would be much unused line capacity. Once a hydro site is fully developed, there is usually no economic justification for adding thermal capacity at the same place to keep the lines to remote load centers fully loaded.

By the fall of 1957, more than 100 US electric utilities were participating in the development of 18 different nuclear reactor projects, according to James F. Fairman, Consolidated Edison Co of New York. These utilities, he said, together serve a substantial majority of US electric customers.

These projects will have a combined capacity in excess of 1.5 million kw and are expected to involve expenditures by the companies of more than $500 million. These companies have two incentives: Need for a new source of energy to supplement fossil fuels to meet growing demands; and, development of a cheaper means of producing electricity.

Fairman's paper described the steps—political, organizational, and financial—in the development of Shippingport, Indian Point, Dresden, and other nuclear power projects now in various stages of materialization. The costs of these developments, he said, have been spread over such a large geographical area that they are practically negligible on a per capita basis.

As long as private financing predominates in the construction of US nuclear power plants, it is doubtful that natural uranium, gas cooled, graphite moderated reactors will become as important here as they are in Britain, according to Donald H. Stewart, AEC. Inherent high capital costs, he said, are the deterrent.

Enrichment Considered

The effect of capital costs on final power costs, especially under private financing, is so large that it may determine the selection of fuel enrichment. The somewhat higher fuel costs incurred by the use of slightly enriched fuel are more than offset by savings in capital costs. These savings come about because enrichment permits the use of smaller reactors for given heat outputs and higher specific powers and allows more freedom in the choice of materials and designs.

But new reactor types may eventually pave the way for greater capital cost reductions. Besides the pressurized and boiling water reactors, the most completely developed US systems, a large variety of other types is being developed. These include the sodium graphite, aqueous homogeneous, liquid metal fueled, fast, high-temperature gas cooled, fused salt homogeneous, organic moderated, gas cooled D_2O moderated, sodium cooled D_2O moderated, and slurry reactors.

To solve materials and other problems for any of these systems may take the development of a technology as complete as that developed on the water systems. It is US belief that it will be 10 to 15 years before

much of the new power plants will be of these types.

The main obstacle to cheaper reactor fuel is a low burn-up yield from uranium, according to W. B. Lewis, Atomic Energy of Canada, Ltd. But a burn-up of 1% is in prospect from natural uranium heavy-water moderated reactors, and a make-up supply of 12,000 tons of uranium element per year would support 100 million kw capacity.

As thorium contains a fissile nucleus, a system based on it requires uranium also. Nevertheless, in the long term view thorium may become the major source of nuclear power.

J. A. Jukes, United Kingdom Atomic Energy Authority, pointed out that in recent years proved reserves of uranium in economically workable deposits have increased greatly. Deposits at Ambrosia Lake in New Mexico are believed to contain 30 million tons of ore at good concentrations. These large proved reserves, together with the fact that many uranium mines in all parts of the world will have amortized their capital costs within a few years, while still having workable deposits, implies that the cost should be below the prevailing one and should remain there for at least the next decade. This is true despite an increasing demand for natural uranium for civil purposes.

Two Reactors Hold Field

The prospective buyer of a large nuclear power plant would give serious consideration today to only two reactor types, according to Sir Christopher Hinton and L. Rotherham, Central Electricity Generating Board, UK. These types are the graphite moderated gas cooled, preferred by the British, and the pressurized water reactor, preferred in the US.

Each succeeding design for plants of the Calder Hall type will show new capital and operating costs advantages.

In solving can temperature problems, as nuclear plants become larger, the British may yet go to the use of enriched materials for the fuel element. Such expensive fuel elements could be justified only if a high fuel element burn-up is achieved. Although better performance of the reactor, arising from engineering developments, can be expected soon, long-term improvements from the achievement of a higher top temperature in the heat cycle can come only from advances in technology. This would involve the use of ceramic fuel elements canned in a material such as beryllium and made in a form that would permit higher ratings and burn-up.

The pressurized water reactor has a slightly lower capital cost per kw than the UK type, which could not use aluminum or magnesium for canning materials, but had to use the more expensive zirconium. Successful development of the American type is due largely to the production of enriched uranium at a lower price in the US. The main cost of enrichment lies in the electric power for driving compressors in the diffusion plant. The US has large supplies of cheap electrical power.

Sweden Has Uranium

Their many differences considered, Calder Hall and Shippingport remain the principal competitors in the Western World.

Railroad transport of fissionable materials involves carrying very small bulks of fuel which require weighty lead screens and other precautionary measures considerably increasing the mass transported, according to J. Ravelli, Societé National de Chemins de Fer Français. This transportation cost is high enough to justify any steps to bring it down to a minimum compatible with public safety. Economically substantial results could certainly be obtained by systematic studies to which public carriers could contribute the weight of their experience.

Although Sweden has no fuel, oil, or coal, it has large deposits of uranium in low grade oil shales, according to S. Ekefalk, P. H. Margen, and T. Nyten. As hydro power can meet electrical needs for the next two decades, the first Swedish industrial nuclear stations will replace oil-fired stations for district heating. These can be in the order of 100-Mw heat, and the reactor considered is of the thermal heterogeneous type with natural uranium as fuel in the form of sintered uranium oxide fuel elements and heavy water as moderator, reflector, and coolant.

The first German reactor, a research unit, will use natural uranium as fissionable material, and heavy water as moderator and coolant, and will be similar to Canada's NRX, according to Prof. Dr.-Ing K. Wirtz, German Federal Republic. This reactor is under construction at Karlsruhe, but its contribution to the production of energy still remains economically unsettled.

Greater storage and higher head are often required at dams originally constructed to fixed heights. Arrangements to increase the initial height of gravity dams reported at the New York meeting included:

1. Joining to the downstream face an additional gravity section, independently stable, properly drained to obviate water pressure exerting an overturning force along the joint, and properly bonded and keyed to the initial construction.

2. Extending buttresses from the downstream face to reinforce the original mass-concrete construction and carry the additional load from the extension.

3. Building all parts of the initial structure to the full horizontal dimensions for the completed structure.

An Egyptian paper described the third heightening of the Aswan Dam; a German paper, the heightening of the Rur Valley Dam Schwammenauel in the Eifel; and, a paper by two engineers of the Pacific Gas & Electric Co, the thickening of the Balch Diversion Dam, a thin concrete arch dam of the variable-radius type.

Fly Ash Discussed for Dams

The New York meeting also featured papers on economical substitutes, notably fly ash, for some of the cement used in mass concrete for dams, tunnels, and heavy industrial foundations. In this area, contributing nations included: The United States, Great Britain, Japan, and India.

The consensus was that the strength of fly ash concrete is rather higher at later ages than that of plain concrete; that its temperature rise due to hydration and volume change due to setting are relatively little; its workability and impermeability are improved; and, its freezing-and-thawing durability is unimpaired.

The use of fly ash in the Sudagai Dam, Japan, for instance, improved the concrete and saved on construction costs considerably.

2,200 Papers Give World

5,000 Geneva delegates hear US, USSR favor enriched fuel reactors; Britain and France natural uranium ones

J. H. M. SYKES, Special Correspondent, Bedford, England

Two thousand two hundred papers; 5,000 delegates; two gigantic exhibitions—these indicate the scale of the Second International Conference on the Peaceful Uses of Atomic Energy, at Geneva, Switzerland, September 1-13.

First, some broad conclusions. The world has reached the stage where several different designs of fission reactor have been proved to be workable, reliable, safe to operate, and reasonably likely to be economic in competition with alternative sources of power. Techniques seem to divide naturally under two headings:

American and Russian practice which uses enriched uranium and water or heavy water as the heat exchange medium.

British and French practice which uses natural uranium, with gas as the heat exchange medium.

In actual power production progress, Britain now holds the lead: in research and development, the US.

Paths Parallel

On fusion progress—the development of thermonuclear devices—declassification of information is between Britain and the US, and apparent complete relaxation of secrecy by the Russians had the result of showing all three countries working on parallel paths, having reached approximately the same level of progress. None would give an estimate of much under 20 years before a practicable and economic solution to the fusion problems would be found.

In fields other than electric power generation, the US leads in marine applications of nuclear power, having the famous submarines, headed by the Nautilus. The USSR comes second, her icebreaker Lenin now nearing commission. Sweden is the first to build a reactor for precinct heating, as well as for generating power.

There are at present 13 reactors at work, with a net useful export capacity of 200 Mw in operation. In the UK, the three Calder Hall units at present critical (a fourth is scheduled to go on load at the year's end) have sent out 730 million kwhr, and so saved 400,000 tons of coal.

The Shippingport plant, in the US, operative since December, has sent out 90 million kwhr, and seven other reactors in the States have contributed experimental amounts of power to utility networks.

One 5-Mw plant in the USSR has operated satisfactorily for four years, but no output figures were available. The G.1 reactor at Marcoule, France, in operation since 1956, has sent out experimental power.

That's the present situation. Now for the future. In the UK, there are under construction four major plants for the nationalized utility authorities: Berkeley, 275 Mw; Hunterston, 300 Mw; and Hinkley Point, 500 Mw. The first two are scheduled for full load on the first of the two reactors in each station in December 1960, the second reactor coming in a year later. Hunterston is scheduled for 1961/62; Hinkley Point for 1962.

The UK nuclear program provides for an overall 5,000 to 6,000 Mw by 1966; but a surplus of coal (now becoming an economic embarrassment) may cause a slight modification of nuclear construction in favor of thermal plants to burn this low-quality fuel. The nuclear plants would still be built, but the rate of increase of size might be slowed.

W. Strath, UK Atomic Energy Authority, said that Britain's growing coal deficit (seen in the long-term, not the short-term coal-surplus conditions) made it imperative that the country embark on a nuclear power program as soon as possible. The Calder Hall type reactors had proved reliable and reasonably economic: the first commercial power production reactors, if operated on 80% load factor, would be competitive with other sources of power by mid-1960's. After that, the problem would arise that base load growth might not equal nuclear plant growth, and to operate reactors at low load factors might well make them uncompetitive. This could mean a reconsideration of the program, although by then reactors of the same general design principle may be available at lower cost.

Enrichment Possible

"Lower capital costs" Strath said, "may well mean more highly developed fuel elements. The higher rating of the fuel will require a greater surface area for heat transfer, so that the present single thick uranium rod will be replaced by clusters of thin rods or plates. At the same time the aims of higher gas temperatures and longer burn-ups may lead to cans of stronger and perhaps less easily worked material; and some enrichment may well, in consequence, be desirable or indeed essential. The cost of such fuel per ton is bound to be much higher, and it is therefore important that the amount of heat that can be got from each ton should be greatly increased. If we can improve fuel utilization to such an extent that fuel costs do not rise despite the use of more elaborate fuel elements, we shall have done well. It is indeed possible that we may do even better and actually reduce fuel costs as well as capital costs".

Picture of Nuclear Advances

Another quotation from Strath's paper runs: "We are moving along the gas/graphite route because we feel sure that it offers the best prospects for certain and early progress towards our objective. Inevitably, this has meant that we cannot seek to emulate the broad front approach favored by the US."

Describing the US program, Dr. Chauncey Starr, vice president of Atomics International, said:

"There is no 'best' reactor: the merits of reactors fueled with natural uranium, as compared with those using enriched uranium have been a matter of serious concern in the planning of major nuclear power systems. It has been believed that such a basic decision would permanently determine the types of reactors involved in such systems.

"In fact, as development of both families of reactors proceeds, it is becoming quite apparent that many of the supposed differences between them are diminishing. It is therefore important to give consideration to the long-term world-wide circumstances which may eventually affect the use of both natural and enriched uranium reactors."

Gives US Program

Louis H. Roddis Jr., US Atomic Energy Commission, summarized the US program, in the session in which W. Kenneth Davis, Bechtel Corp, and U. M. Staebler, AEC, read the definitive paper. Roddis said that there were five main types under review. First, the pressurized water reactor (Shippingport) which exhibited a very satisfactory degree of stability and could accommodate large load changes without strain. Then there was the boiling water type, which had also proved stable in operation. Next came the sodium-cooled reactors, which have been successfully operated.

No long-lived deposited radioactivity had been found in the primary system. One experimental organic cooled and moderated reactor had operated successfully. Reactors operating on fast neutrons or with intermediate-energy neutrons had been found to be stable in operation and not difficult to control. Fluid fuel reactors had shown very great stability, and mechanical control rods had proved unnecessary. Corrosion problems had been severe, but had been overcome. Demonstrations of very-high-temperature reactor operation had been successful, but materials had been tried severely.

In a press conference, Roddis said that there had never been an "uncomfortable release of radioactivity." Questioned as to the degree of radioactivity in the turbines, he said that so far it had been manageable. US has experienced no fuel element ruptures.

Roddis, in a paper presented jointly with Clark Goodman, former assistant director for technical operations, AEC, and Dr. W. H. Zinn, General Nuclear Engineering Co, gave costs for many US civilian experimental reactors.

The USSR program was outlined by Professor Emelyanov. He started by showing that the power requirements of the Soviet Union are entirely provided for by coal and oil reserves and water power resources. Yet in certain areas, resources are comparatively limited so that nuclear energy could profitably be employed.

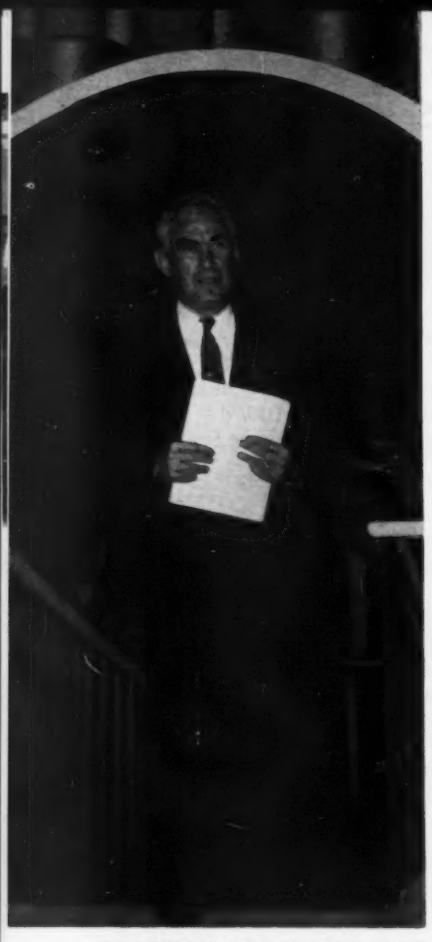
Most reactors to be built in the USSR would use ordinary water as coolant. The present construction program included four stations, of 240, 420, 50 and 250 Mw. The 420-Mw station is in the Voronezh district. Emelyanov announced informally that a 100-Mw plant was started up in Siberia on September 7.

Russian Speaks

The 420-Mw plant will have two pressurized water type reactors, the water under a pressure of 1470 psi. Uranium oxide fuel elements with a 1.5% enrichment will be employed. The 50-Mw reactor, being built in the Uljanovsk district, will mark the transition to the boiling water type. Emelyanov said that various types of boiling water reactor were being constructed to allow tests under full-scale conditions. A station later to be built at Beloyarsk will have four reactors, each forming a unit with a 100-Mw turbo-generator. Steam will enter from the reactor at 1,323 psi, 480-500C.

An experimental heavy-water reactor with uranium in solution or suspension is being constructed "in the Volga region." A 50-Mw liquid sodium reactor is being built there also. In 1956 an experimental fast reactor, with 100-kw thermal out-

TRIGA, General Atomic's swimming pool reactor, attracts Lewis L. Strauss, former AEC head, and Dag Hammarskjold, secretary general, United Nations



CONGRESSMAN J. E. VAN ZANDT
(R. Pa) visits commercial exhibits

put, was started up, and a 5-Mw plutonium-core sodium coolant fast reactor was brought into use in 1958.

The USSR is carrying out work on small mobile nuclear stations, and construction of a 2-Mw unit is said to be nearing completion. The pressurized water cycle is employed, and the reactor is incorporated in a vessel 39 in. in dia and 85.8 in. high. Ordinary water serves as coolant and moderator.

Speaks for France

The next largest reactor program presented was that of France. Pierre Ailleret showed that France has to import about 40% of her energy needs; and in the field of electrical energy, water power resources are within sight of complete harnessing. Apart from the newly discovered Lacq natural gas reserves, power-producing fuel will be exhausted sooner than in most other countries. Dr. Homi J. Bhaba's paper gave these figures for years to exhaustion of coal reserves: USA 3,259, UK 750, and France 220.

Ailleret said that France "simply cannot afford to experiment with a large variety and therefore must make a choice" of reactor. Its choice was the gas-cooled graphite moderated reactor, for three reasons: the existence of ample natural uranium; a large graphite industry; and, actual experience on an experimental scale.

The experimental reactors at Marcoule, known as G.2 and G.3, will use prestressed concrete for the gas-tight pressure vessel, and will produce usable amounts of energy. They are expected to be the first reactors to provide uniform radiation to all fuel elements. The rating of the G.2 plant will be 30 Mw, and the first commercial reactor for utility use, known as "E de F.1" (Electricité de France) will have an electrical rating of 63 Mw, E de F.2 being upgraded to 170 Mw. All these are to be of the graphite moderated gas cooled type, similar to G.1 and to British designs.

France plans to install one reactor every 18 months, and this will be equal to 10% of all new power production plant.

Countries planning to build their own reactors include Switzerland, where an underground station to provide precinct heating is to be constructed at Zurich. The 30-Mw (thermal) unit will be of the heavy water moderated and cooled type, and will use natural uranium as fuel.

Gives Canada's Plans

Belgium, in conjunction with the General Nuclear Engineering Corp, Dunedin, Fla, USA, plans a 125-Mw indirect cycle boiling water reactor, incorporating an oil-fired or coal-fired superheater. With this arrangement the plant would be competitive in cost per kwhr under Belgian conditions.

Canada described proposals for cheap nuclear power to compete with her relatively cheap sources of energy elsewhere. Using uranium oxide fuel, bi-directional fueling and cool heavy water as the moderator, the methods proposed would allow for natural uranium to have a burn-up figure of 0.8 to 1.0% without reprocessing, said Dr. W. B. Lewis, Atomic Energy of Canada, Ltd. It was hoped in this way to compete with the 6 mills per kwhr, the present energy price with coal at approximately $9 a ton.

What Italy's Doing

Italy has a 900-Mw program, divided among five constructional and operating groups. The SELNI organization, in conjunction with Westinghouse Electric Corp, plans to build a 135-Mw pressurized water reactor, and the SORIN group is engaging in research, with a swimming pool reactor. AGIP Nucleare organization signed a contract during the Geneva Conference with the British Nuclear Power Plant Co for a 200-Mw "Calder Hall" type plant, to be constructed near Rome for the group known as SIMEA.

All Italian reactors so far projected will employ imported equipment mainly. But in Sweden there is an active nuclear plant building industry. One reactor of 300-kw for research is at work, and a reactor is under construction to produce 15 Mw of electrical energy and 70 Mw in precinct heating, for 12,000 apartments in a Stockholm suburb. This is of the pressurized type, using heavy water and zircaloy canning for the natural uranium fuel elements.

A Russian-designed reactor of 150-Mw, using natural uranium and a heavy water moderator, with high pressure carbon dioxide as the coolant, is being built in Czechoslovakia.

West Germany made a late start. The German paper said: "We have to weigh each project solely on its merits for civilian applications." Nevertheless, there are now eight research reactors, either operating or under construction. Five are of American origin, two of British design, and one originated in Germany.

The paper said: "As things stand today, there is no one type of power reactor which may be considered as the only reasonable choice." The provisional German program calls for four or five 100-Mw units to be commissioned by 1965. It is expected that preliminary project orders will be placed in 1958.

In the scientific exhibition the US exhibit on fusion won universal praise. The Stellarator, the mirror machine, and the DCX arc machine proved of the greatest interest to scientists.

Britain showed a model of the Zeta machine in use at Harwell; the

(Continued on page 100)

when weather's rough and time short . . .

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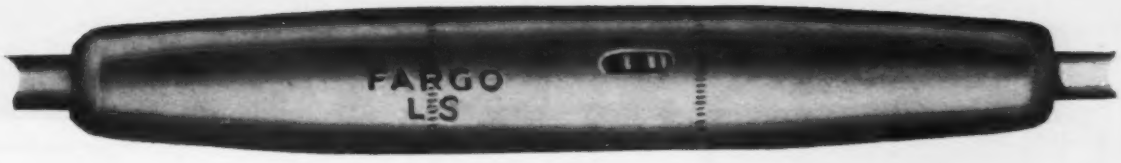

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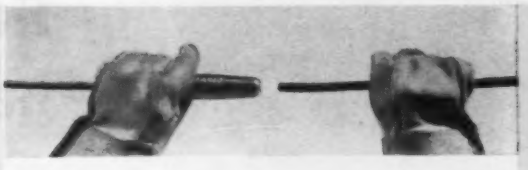

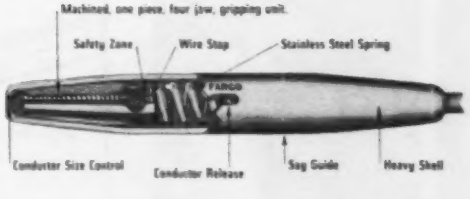

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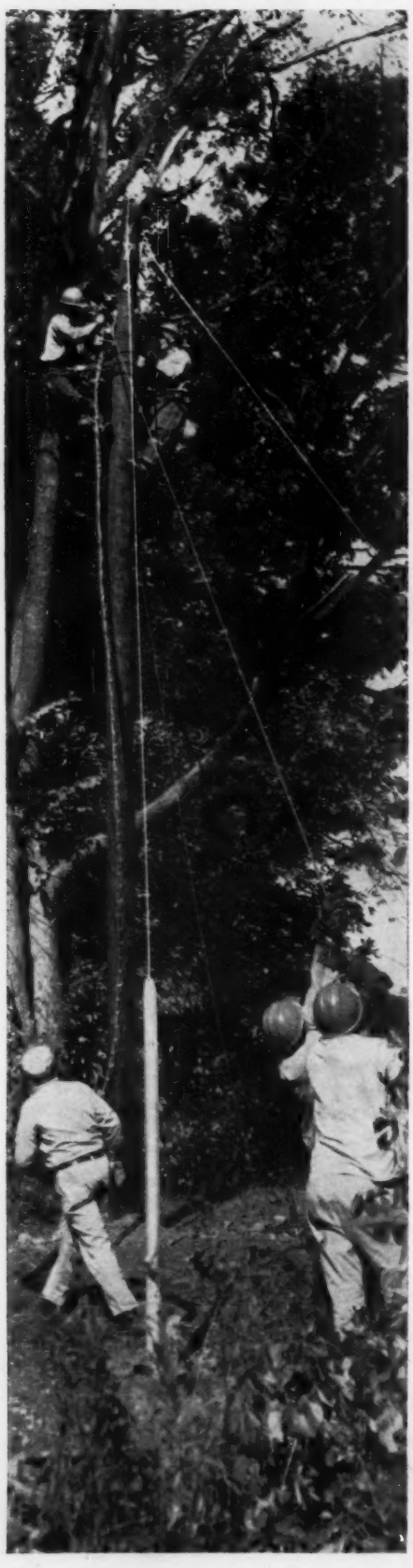
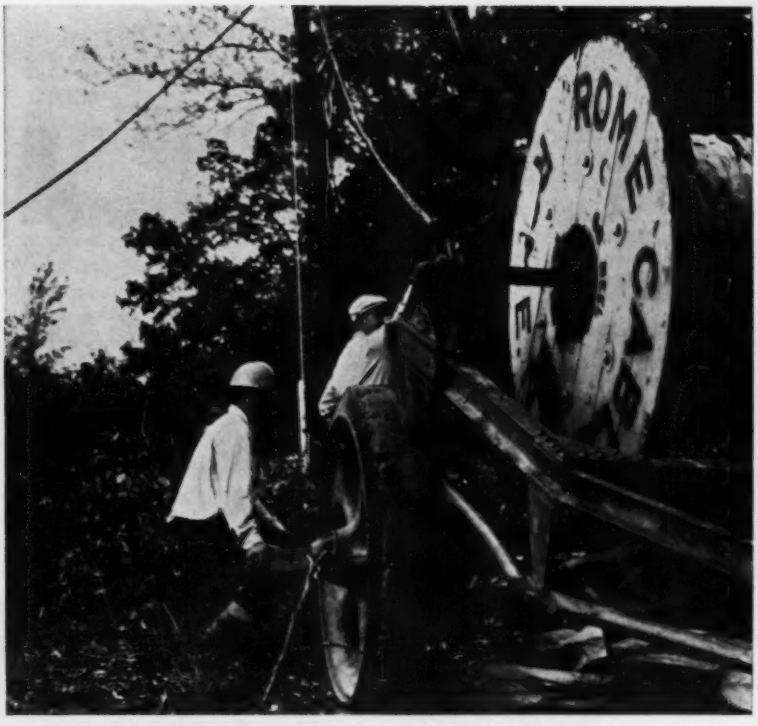
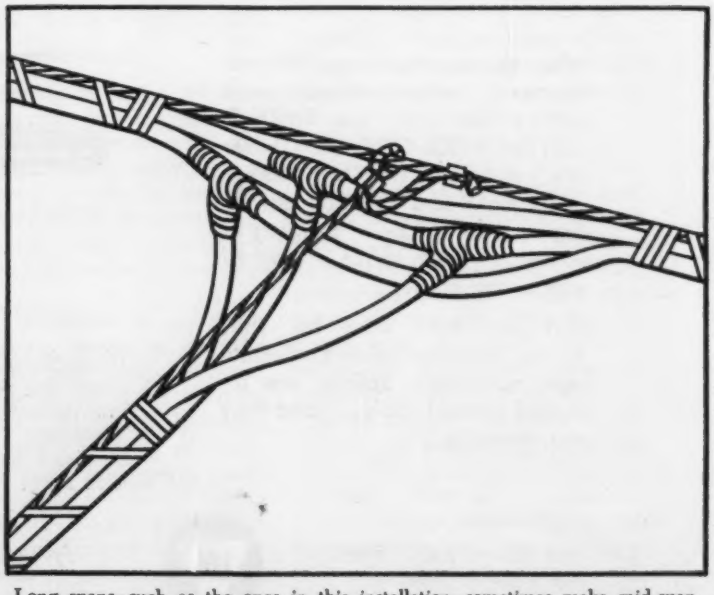




A take-up arrangement at the cable trailer keeps Rome's preassembled aerial cable taut as it is pulled by the truck winch.

How Rochester Gas & hazards with Rome's



Long spans—such as the ones in this installation—sometimes make mid-span tapping necessary. The reverse-lay construction of Rome's preassembled aerial cable permits easy mid-span tapping anywhere along the line.

Temporary pulleys accommodate the cable as it is pulled nearly 1000 feet through a heavily wooded area.

Tree trimming is reduced to a minimum because falling branches, even trees, can be supported by the cable itself.

Electric guards against power line preassembled aerial cable

For an installation in Pittsford, New York, Rochester Gas & Electric had to run a 5-kv power distribution line from the main street to a new school.

Rome's 5-kv preassembled aerial cable was used on this installation. One thousand feet of this cable had to pass through a densely wooded tract.

Here's what the men who handled the installation said about it:

According to James E. Cooper, Supervisor, Line Maintenance, one important advantage of this cable is that falling branches—or even trees—can be supported by the cable itself. The staunch characteristics of preassembled aerial cable reduce the danger of outages caused by storms or high winds.

Carl Foster, Foreman, Monroe Tree Surgeons, in charge of clearing the right of way, stated that tree trimming probably wouldn't be required for another five years in this particular location. This is in contrast to their normal two-year period for conventional open-wire systems.

In the opinion of Bob Tanner, Foreman, R. E. Tanner Line Construction Company, another important advantage of preassembled aerial cable is that it can be installed much faster than its open-wire counterpart.

The comments of these men describe only a few of the many advantages to be gained by using Rome's preassembled aerial cable.

Improved Regulation

Aerial cable, because of its close geometric spacing as compared with open-wire circuits, has a lower reactance. Therefore, voltage drop is approximately half as great as typical crossarm construction. Similarly, for a given allowable voltage drop, power can be transmitted twice as far.

Ease of Tapping

Mid-span tapping is practical with Rome's preassembled aerial cable. The reverse-lay construction eliminates the necessity of making taps only at the pole ends of the installation.

Improved Appearance

In residential areas, it is most important to have an attractive aerial cable installation. The inconspicuous aerial-cable attachment to existing poles and the elimination of additional crossarms or crossarm hardware makes this a valuable aid to modern power line installation appearance. Rome's preassembled aerial cable requires a minimum of tree trimming, too. In many cases, aerial cable eliminates the need for residential tree trimming.

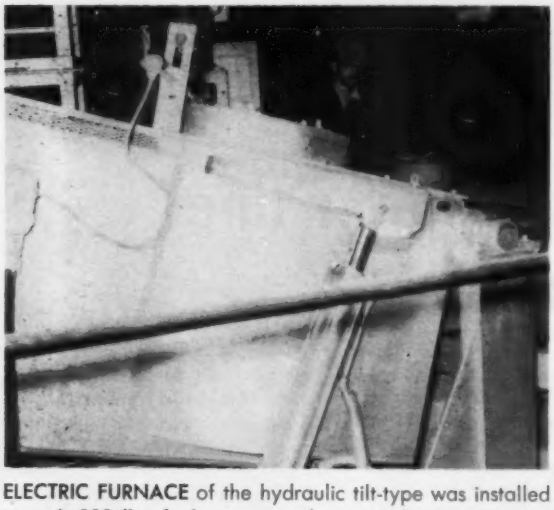
Guard against power line hazards and reduce your power line maintenance with Rome's preassembled aerial cable. For more information on this product, contact your nearest Rome Cable representative or write to Dept. 771, Rome Cable Corporation, Rome, New York.

ROME CABLE

CORPORATION

Saves $10,250 on Al Reclaiming

SHEARING MACHINE cuts aluminum conductor in short lengths which then fall into the tumbler (left foreground)



ELECTRIC FURNACE of the hydraulic tilt-type was installed to melt 200 lb of aluminum an hour or about seven pigs

FURNACE tilts to empty the molten aluminum into molds. Pigs are removed from crucible molds in next-to-last step

Process cuts Duke Power yearly costs, brings better price for melted product

J. E. CHAPMAN, Supt, Electrical Construction & Maintenance, Duke Power Co, Charlotte, N. C.

Processing aluminum scrap by a new method saves Duke Power Co about $10,250 a year. These savings are in terms of reduced storage space and lower processing costs, as well as in the higher value of the reclaimed scrap, all made possible by the change in procedure.

The new process was developed from a study to arrive at a more economical handling of aluminum scrap. It is used for bare aluminum and ACSR wire only. Formerly such wire was cut into 3-ft lengths, the strands were removed manually from the cores, and the aluminum was baled for sale. This procedure took storage space, and the low-grade scrap brought a low price.

Now the wire is cut into 3-in. lengths by a shearing machine, the force of the shears fusing many strands together. These are separated in a rotating cylindrical tumbler mounted on a 5-deg incline. The strands drop into the tumbler where four baffles welded on the inside in line with the axis pick them up and drop them continually until they emerge from the far end of the 8-ft tube.

The strands, by then all separated, are dumped onto a conveyor. As they pass over a magnetic pulley, the steel cores are retained on the belt and the aluminum drops free. The strands go to a hopper and the steel to a chute.

Aluminum strands are melted in a hydraulic tilt-type electric furnace controlled thermostatically to cut off at 1,280F. This temperate is 65F above the melting point of the metal. As the furnace melts 200 lb an hour, about seven pigs are poured in that time, for an average of 56 pigs in an 8-hr day. Thus the daily average is 1,600 lb. Optimum furnace efficiency is obtained when only two pigs are poured simultaneously from a full crucible which pours about 19 pigs. These are bound in groups of 55.

Here are the ways in which Duke Power saves:

1. Storage area has been reduced by 75%, a reduction of about 2,000 sq ft at 25¢ per sq ft for a yearly saving of $500.

2. The processing cost has been cut from 2¢ to 1.5¢ per lb. At an annual rate of 150,000 lb, this amounts to a $750 saving.

3. As the reclaimed aluminum in now 99.5% pure, it brings a better price. The price is now about 22¢ per lb for ingots compared with the previous 16¢ per lb for baled wire. Accordingly, the company realizes an additional $9,000 per year, based on the 150,000-lb reclaiming rate. Duke Power is seeking to increase the selling price by further improving the purity of the processed aluminum through the installation of another stage of magnetic separation.

Turbine in supercritical-pressure steam system uses

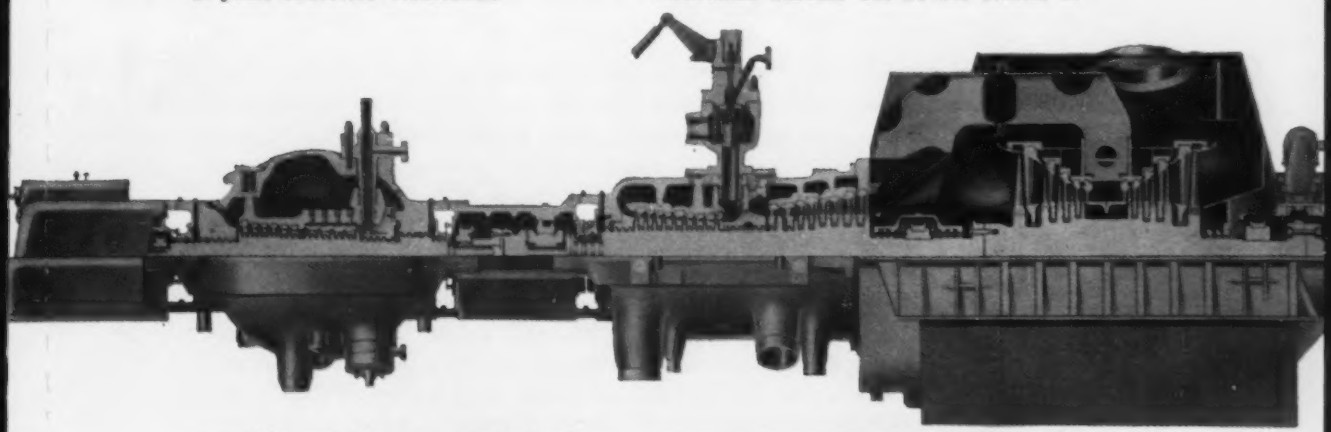
Nonpareil TURBINE OIL

. . . and
American Gas & Electric Power
receives
life-of-turbine guarantee for the oil

A General Electric turbine, for which the main steam pressure is 4,500 psi and the temperature is 1,150°F. has now been in service for more than a year. The performance of this developmental turbine, its associated steam generator and other equipment, indicates that this plant will set the pattern for steam power plants for the future. It is appropriate that the turbine oil is one that has been proved in more than 30 years of service—NONPAREIL.

To achieve new records in efficiency of operation and to accomplish even more efficient generation of electric power, American Electric Power engineering management had to be *sure* of every item of material used in the installation. NONPAREIL Turbine Oil was tested and found fully capable of providing the superior lubrication required by this history-making unit.

Over 1,000 turbines are in service using NONPAREIL Turbine Oil. To the owners of each of these turbines, a guarantee has been issued, which certifies that *for the life of the turbine* the oil will never exceed an acidity level of 0.15 mg. KOH/g. Most often it is in the order of 0.03 to 0.06 mg. KOH/g.



An industrial lubrication specialist in the Standard Oil office near you, in any of the 15 Midwest or Rocky Mountain states, will be glad to give you additional data on NONPAREIL Turbine Oil. Call him. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

Quick facts about
Nonpareil Turbine Oil

- Will not permit formation of harmful acids
- Will not permit formation of sludge or oil varnish
- Will maintain good demulsibility or water separating characteristics
- Has high resistance to foaming
- Contains adequate rust inhibitor

You expect more from STANDARD and get it!

Announcing the

IBM

7070

DATA PROCESSING SYSTEM

• **First of IBM's line of fully transistorized data processing systems is the new IBM 7070—the most powerful and completely balanced system in the medium-scale computer field. It combines, for the first time in a solid-state system, higher storage capacity, faster computing speeds, new high-speed input-output units and a complete programming system.** ***In short, the IBM 7070 gives more performance per dollar than any system in its class.***

The SYSTEM: Transistor design lowers initial cost, minimizes cooling power and maintenance needs. "Building block" design grows as you grow. Other exciting features: IBM 7070 "reads," "writes," computes simultaneously; provides "automatic priority processing" for most economical use of system time. Ninety-nine built-in indexing words—more than in any other system—mean fewer operating instructions, faster, simpler programming. RAMAC® files provide immediate access to data.

The SERVICE: Unmatched IBM systems know-how is part of every IBM 7070 "package." From education of your personnel to top-notch service engineering, from program planning to testing—IBM men and methods stand by you to assure profitable operation as fast as possible. In addition, with the IBM 7070 you will receive a library of advanced programs at no extra cost!

The SAVINGS: Major design breakthroughs make possible lower lease or purchase prices, lower operating costs. For example, the IBM 7070 will sort at least 30% more economically than other computers. And equally important are the savings you make through added efficiency and more complete management information with the IBM 7070.

For further information, call your local IBM representative. Ask for free booklet, "IBM 7070." Or write: International Business Machines Corporation, 590 Madison Avenue, New York 22, N. Y.

IBM **DATA PROCESSING**

Precast Concrete Trench Opens Easily

C. W. BERINGHAUS, Associate Engineer, Cincinnati Gas & Electric Co, Cincinnati, Ohio

A control cable trench made of lightweight precast concrete sections is being used by Cincinnati Gas & Electric Co in new substations and additions to existing substations. Designed by company engineers under the patent name "TrenWa", the installation not only allows the trench to be opened as desired, but also provides a walkway.

The "TrenWa" trench has a higher initial cost than the conventional cable trench, but if any future opening of the trench is anticipated, then the "TrenWa" trench proves more economical than the conventional trench.

Switch Secondary Capacitor Banks

L. T. WILLIAMS, Chief Electrical Engineer, Southwestern Gas & Electric Co. Shreveport, Louisiana

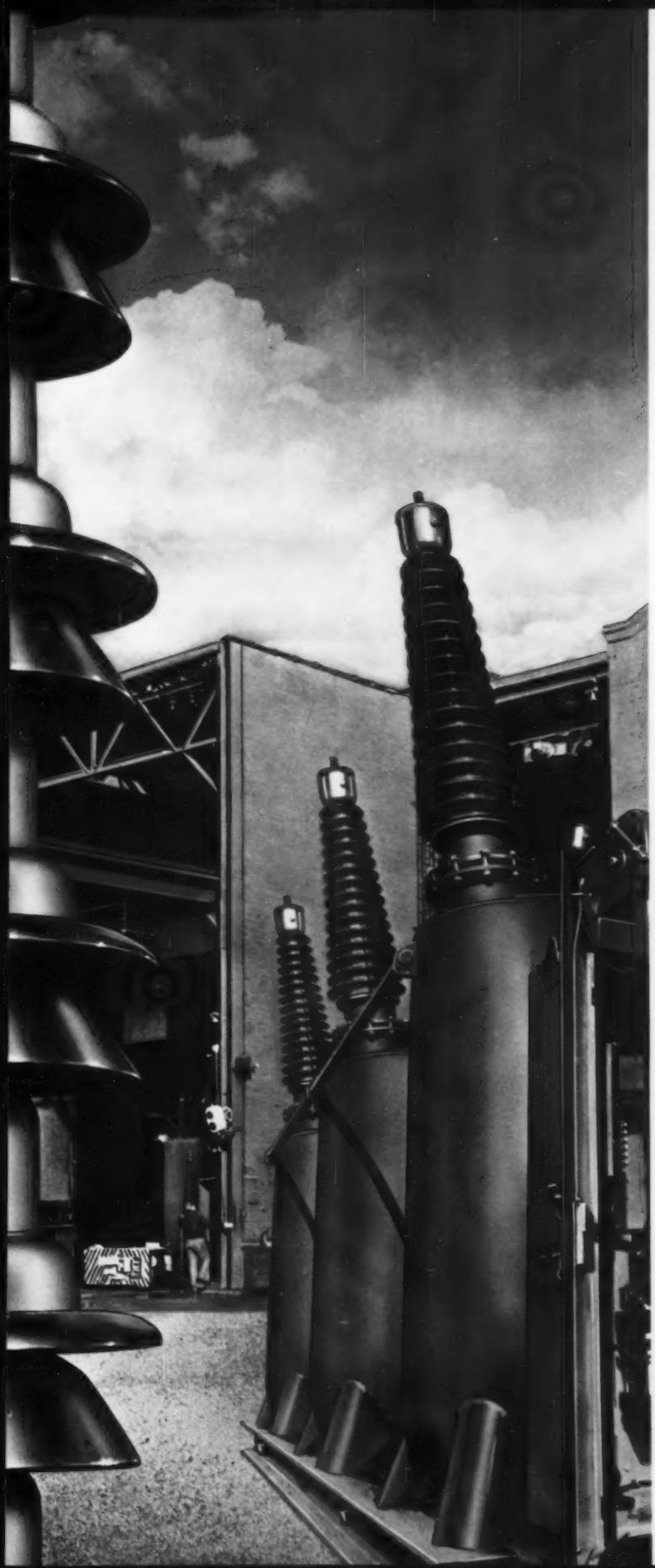
Secondary 5-kvar capacitors, controlled by a thermostatic switch, have been installed on the Southwestern Gas & Electric Co system as a stopgap measure to correct low voltage conditions and relieve overloaded secondaries and transformers. When other construction is completed providing a more permanent solution to the problem the capacitors will be removed.

The switch is factory equipped with a lug for mounting on one capacitor terminal. An insulated lead ties the switch to the secondary. A fiberglass sun shield protects the switch from direct sunlight.

Cost of the switch is less than the cost of connecting and disconnecting the capacitor for two years. It costs less per kvar than switching for primary capacitors on a 300-kvar installation and only slightly more per kvar than switching on a 600-kvar installation.

Room coolers are the usual cause of overloads requiring secondary capacitors. Because coolers operate in accordance with weather conditions, the secondary capacitors must be operated in the same way. Therefore, they must be removed from service when the weather is cool, or excessive voltage increases will result.

(More How To on page 71)



3 million faults... just to prove a point!

WESTINGHOUSE HIGH POWER LAB
IS PROVIDED THROUGH
PLOWBACK
OF EARNINGS INTO RESEARCH

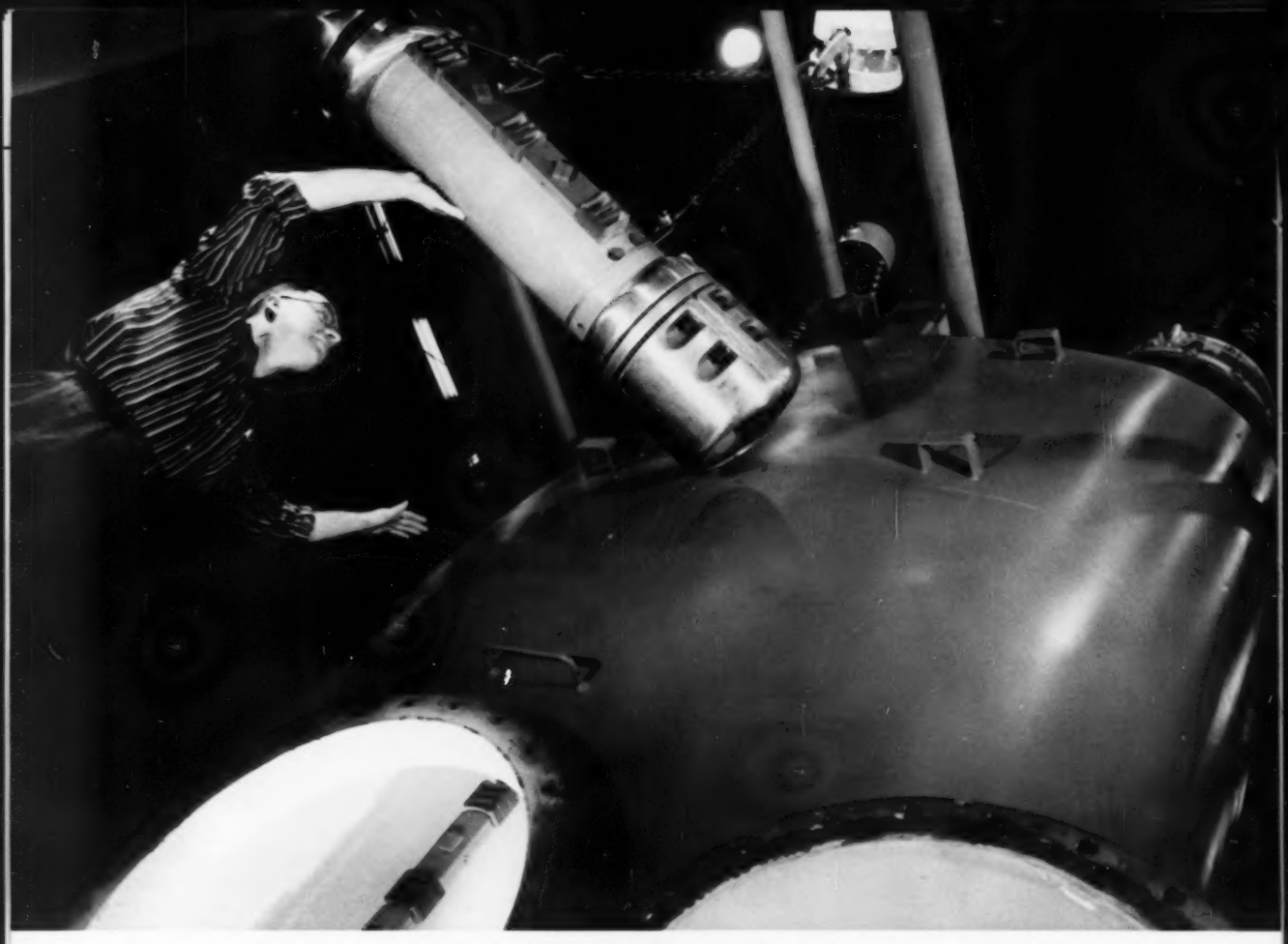
In the 33 years of Westinghouse High Power Lab operation, well over three million deliberate faults have been created to assure our utility customers that they can be *sure* when they buy Westinghouse protective equipment. We *know* the devices will interrupt rated fault currents . . . not from engineering theory alone, but from actual performance under fault conditions the equipment will encounter on your system.

Westinghouse was the first to see the need for this basic proving ground. It has been instrumental in developing many new devices for utilities that have meant greater system stability and continuity. The millions of dollars plowed back into this facility have produced such significant advances as De-ion® Grids, DH Breakers, Compressed Air Breakers and many others.

With the growing voltages on systems today, it is highly impractical to test such protective devices as power circuit breakers on your own system. At the High Power Lab, equipment rated up to 25,000 mva can be tested at any time, and tests up to 345,000 amperes torture equipment to provide the progress to meet tomorrow's system needs.

YOU CAN BE **SURE**...IF IT'S

Westinghouse



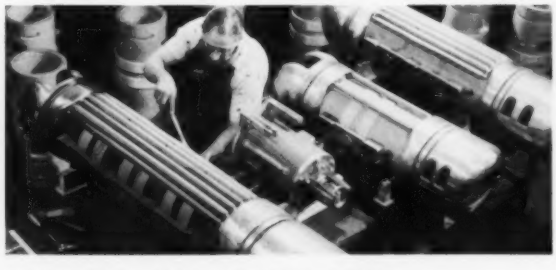
From its very inception in 1929, the Westinghouse De-ion grid has proven capable of interrupting ever-bigger faults by refining and extending the basic design. The familiar multi-break tubular grid, for instance, was designed with four breaks to interrupt faults of 25,000 mva at 345 kv. By adding additional breaks in series, increased interrupting capacities at much higher voltages can be obtained. Such a history of proven capabilities indicates that the sky is the limit so far as eventual capacity is concerned.

440 kv is just around the corner at the Westinghouse High Power Lab

WATCHCASE DESIGN MEETS CHALLENGE FOR INCREASED CAPACITY IN LESS SPACE

Ever anticipating the growing needs of the electrical utility industry, Westinghouse has long been a pioneer in developing equipment before it is actually required. Right now in the labs at East Pittsburgh, Westinghouse engineers are developing circuit breaker components to handle the gargantuan faults possible with transmission lines carrying 440,000 volts. They'll be ready when the industry moves to the next big hurdle in high-voltage transmission.

The fundamental soundness of Dr. Joseph Slepian's De-ionization Theory has been proven over and over again at the Westinghouse High Power Lab as engineers have extended the capacity of breakers, decreased interrupting times and minimized reclosing periods. Here are some of the important industry dividends of the Westinghouse policy of Plowback of Earnings into research:



DE-ION GRIDS PROVED STEPPING STONES TO TOMORROW'S SUPER VOLTAGES

Westinghouse solved two big problems with the engineering of the Watchcase* tank: greatly reduced foundation shock of fault interruption; and substantial saving in oil capacity required. The curved shape of the tank bottom equalizes the compression forces over a big area . . . thus cushioning the shock. Careful research and engineering—backed by testing in the High Power Lab—produced the minimum electrical clearance for safe interruption in the tanks. Results: important savings in oil required and the over-all size of tank, pointing the way to higher voltages and greater interrupting capacities.

*Trade-Mark

JI-97230-2

YOU CAN BE SURE...IF IT'S **Westinghouse**

Photometer Detects Ion Impurities

An ultra-sensitive sodium flame photometer for measuring impurities in condensate and carry-over has been developed by Consolidated Edison. The recording instrument will be used at the 275,000-kw nuclear-fueled Indian Point Station scheduled to go on the line in late 1960.

The photometer was developed from a commercial spectrophotometer to measure small quantities of sodium. It operates continuously as a recording instrument with a minimum of attention. Minute changes in the concentration of sodium at various points on boiler plant equipment are recorded.

The photometer will detect incipient stress corrosion cracking in the pressurized water reactor. This corrosion occurs in the presence of minute concentrations of certain ions, particularly chlorides. Available means of analyzing chloride ions are not capable of detecting the extremely small quantities involved. The photometer detects sodium as the ion most likely to be united with chlorides.

Operating experience at conventional steam plants has shown the photometer to be much more accurate than conductivity tests or pH measurements in evaluating the performance of a de-mister installed in a large evaporator. The new device also detects condenser leakage on high pressure boilers at an earlier stage than conductivity. In addition, the photometer can be used to evaluate the performance of "clean-up" ion exchange units.

Schedule Board Shows Pulverizer Status

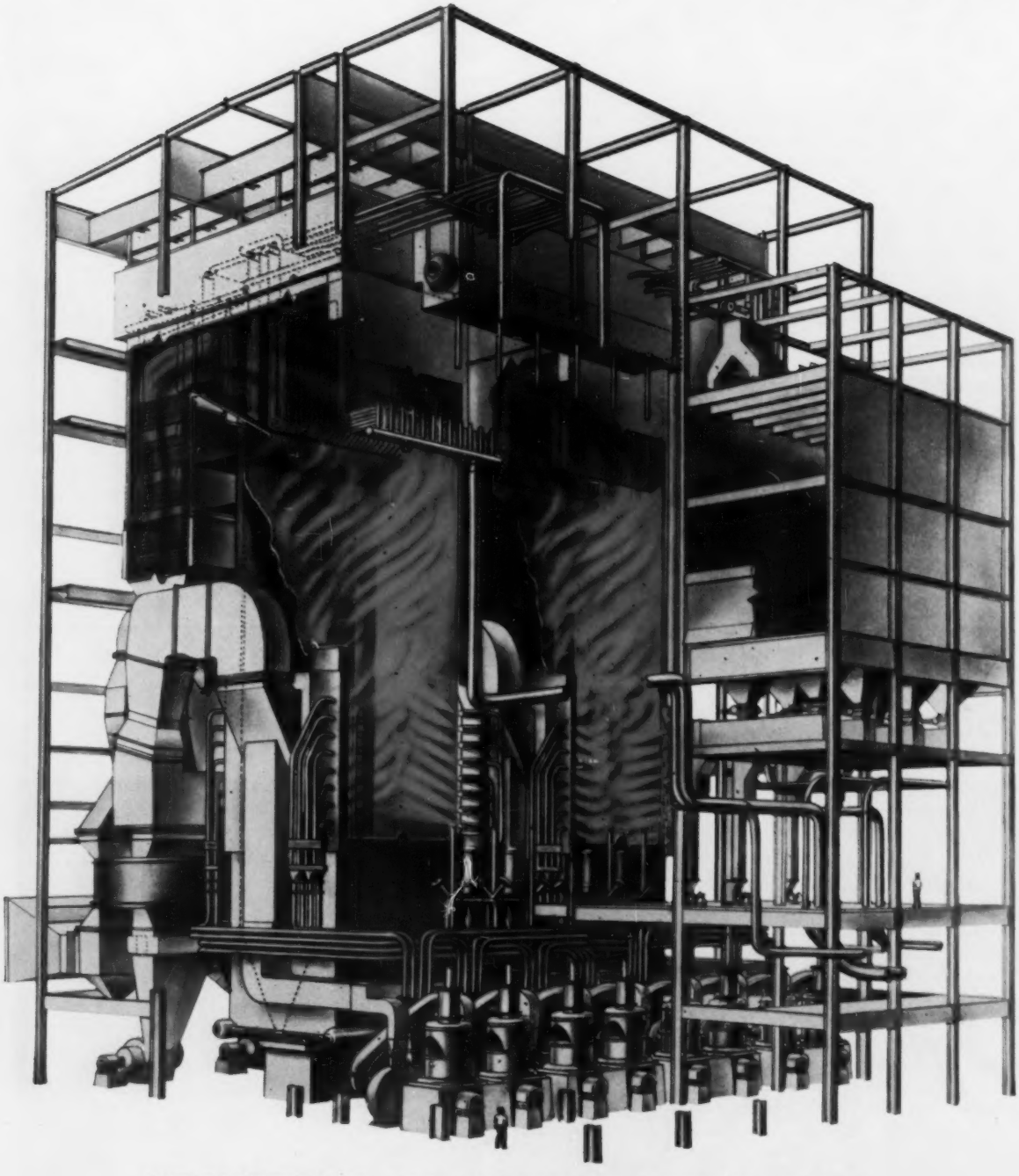
W. J. BUCHANAN, JR., Maintenance Supervisor, Kanawha River Plant, Appalachian Electric Power Co, Glasgow, W. Va.

A schedule board provides complete information for scheduling inspections of pulverizers. It shows at a glance ball sizes at last inspection and hours of operation until the next scheduled inspection.

The board is made of ¼-in. steel plate, and the changeable numbers are on plastic plates mounted on small magnets costing about 6¢ each. The four rows of numbers indicate ball size, current service-hour meter reading, meter reading when the next inspection is due, and the hours remaining until the next inspection.

Information is made immediately available to any personnel needing it. When a repair job is found necessary, the inspection schedule is checked, and both jobs may often be done at the same time.

C-E earns an in the 2400 psi



C-E CONTROLLED CIRCULATION TWIN-FURNACE BOILER

Controlled circulation units of the twin or divided furnace type have amply demonstrated their suitability for high-pressure, high-capacity requirements.

overwhelming preference throttle pressure range

Recent years have seen a marked trend toward the use of the 2400-lb *throttle* pressure, and indications are that this will be the prevailing pressure for units in the 200 MW-up class for some time to come.

The following list of C-E Boilers installed, under construction or on order, reveals the *extent of Combustion's experience* in the design, manufacture and operation of 2400-lb boilers. The total electric generating capacity of these boilers (6,592,000 kw) accounts for well over half of *all* the 2400-lb capacity ordered to date by American utilities.

Another significant aspect of present American practice in this pressure area is the recognition of the C-E Controlled Circulation Boiler as *the design best suited to use of the 2400-lb cycle.* The extent of this recognition may be judged from the fact that 30 of the 33 units listed are of this design. The other 3 are C-E Sulzer Monotube Steam Generators.

C-E Boilers* for 2400-lb Throttle Pressure

COMPANY	STATION	NO. OF UNITS	STEAM TEMP. F	CAPACITY—kw TOTAL
Central Hudson Gas & Electric Corp.	Danskammer	2	1050/1000	250,000
Cincinnati Gas & Electric Co.	Beckjord	1	1055/1005	156,250
Cincinnati Gas & Electric Co.	Miamifort	1	1055/1005	156,250
Cleveland Electric Illuminating Co.	Eastlake	1	1050/1050	187,500
Cleveland Electric Illuminating Co.	Ashtabula	1	1050/1050	225,000
Consumers Power Co.	Dan E. Karn	1	1050/1050	250,000
Consumers Power Co.	Port Sheldon	2	1050/1000	500,000
Dayton Power & Light Co.	Tait	2	1050/1000	260,000
Detroit Edison Co.	St. Clair	1	1050/1000	325,000
Duke Power Co.	Allen	2	1050/1000	330,000
Duke Power Co.	Allen	2	1050/1000	550,000
Duke Power Co.	Lee	1	1050/1000	165,000
Metropolitan Edison Co.	Portland	1	1050/1050	165,000
Niagara Mohawk Power Corp.	Huntley	2	1050/1000	400,000
Niagara Mohawk Power Corp.	Dunkirk	2	1050/1000	400,000
Pennsylvania Electric Co.	Shawville	2	1050/1000	330,000
Pennsylvania Power & Light Co.	Brunner Island	1	1005/1005	300,000
Philadelphia Electric Co.	Schuylkill	1	1050/1000	175,000
Potomac Electric Power Co.	Dickerson	2	1050/1000	350,000
South Carolina Electric & Gas Co.	McMeekin	2	1050/1000	250,000
Tennessee Valley Authority	Widows Creek	1	1053/1003	500,000
Virginia Electric & Power Co.	Chesterfield	1	1000/1000	167,000
Virginia Electric & Power Co.	Possum Point	1	1000/1000	200,000

*The above list covers American utilities only. Abroad, too, the C-E Controlled Circulation Boiler has achieved a predominant position for 2400-lb applications, evidenced by orders placed with C-E or its licensees for 21 units with an aggregate capacity of 5,270,000 kw.

COMBUSTION ENGINEERING

C-181

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE

Manufacturers News

Power Transformer Sound Level Reduced by Westinghouse

A one to nine decibel reduction in transformer sound levels with no increase in cost or size of the units has been reported by the Transformer Div of Westinghouse Electric Corp, Sharon, Pa. An average reduction of 5 db has been achieved over the entire range of power transformers, according to John H. Chiles, vice president of the division.

Typical reductions are in the 69-kv class where the sound level of a 10,000/12,500-kva transformer has been reduced from 74 to 70 db, in the 138-kv class where a 200,000-kva FOA has been reduced from 89 to 84 db, and in the 230-kv class where a 400,000 kva FOA unit has been reduced from 96 to 89 db.

Improvements in materials, methods, and processing are given as the reasons for these reductions. Now, having proved these advances through both experimental and production units, the company is able to offer these gains to all transformer users.

Two years ago a complete sound laboratory was established at the Sharon, Pa., plant. Through the use of recording equipment to analyze test transformers and production units, and other high-power test equipment, Westinghouse engineers were able to evaluate sound dampeners, barriers and complete enclosures, and the means of reducing transformer noise at the transformer core. The test facilities substantiated theoretical modifications to steel formulations, processes, handling techniques, and core building combinations.

Worthington Adopts New Trade Mark

A new, modern design of a trademark has replaced the 73-yr-old one of the Worthington Corp, Harrison, N. J. Shown in picture above with the new and the old (top) are, left to right, T. J. Kehane, vice president, marketing; H. C. Ramsey, board chairman and chief executive officer, and Walther H. Feldmann, president.

Research on the old trademark was begun two years ago. More than 200 mechanical engineers were polled. Nine out of ten failed to associate the trademark with the company.

Worthington's Advertising and Marketing Promotion Dept then conducted a study involving the preparation of hundreds of alternative trademark designs, before deciding on the one chosen. This trademark is a step in the company's new marketing concept. One of the prominent displays of the new trademark will be at the Harrison, N. J. plant facing the Pennsylvania Railroad tracks.

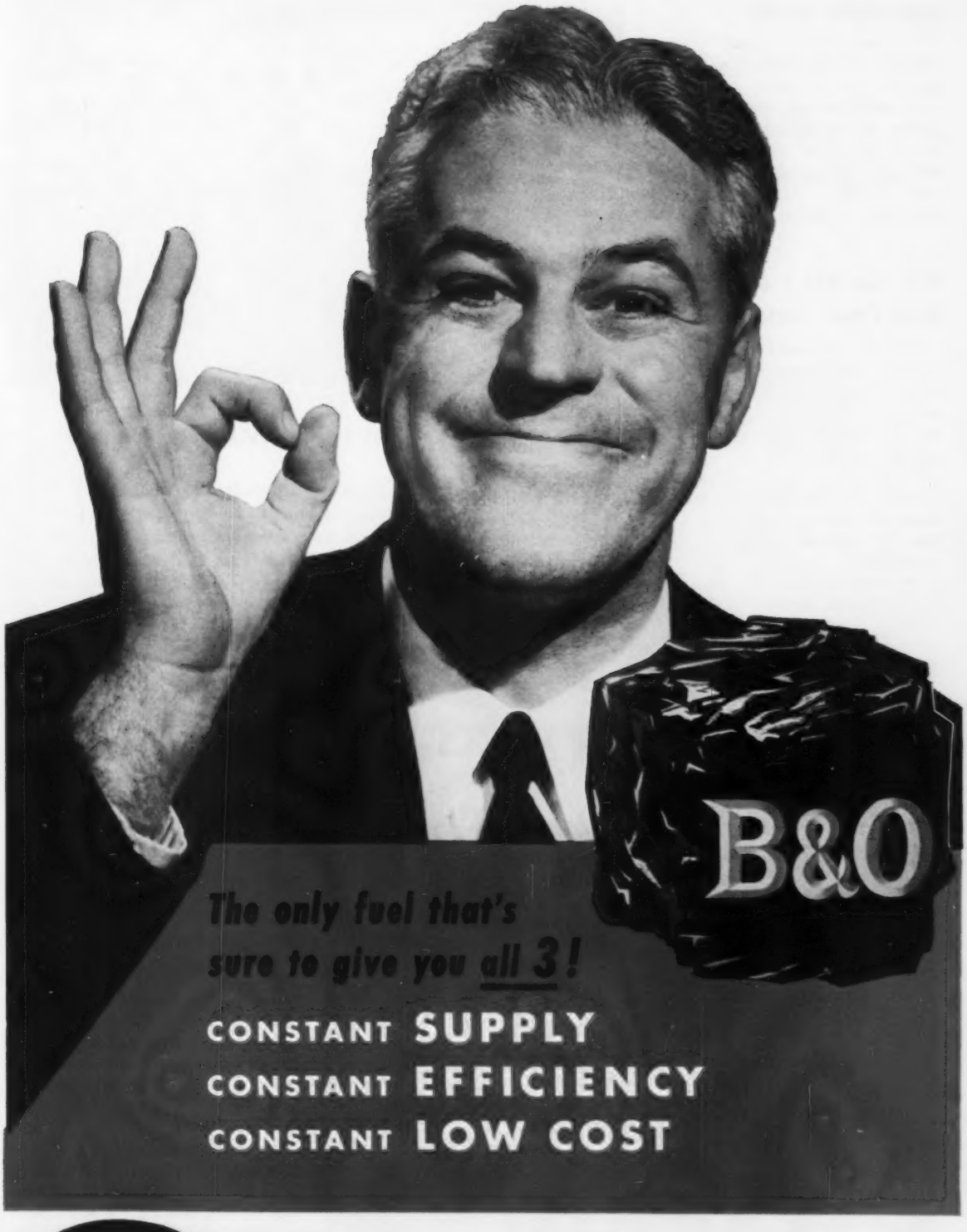
Flow-Matic Codes Digital Computers Automatically

Time and cost of preparing programs for processing of business data on digital computers will be reduced substantially through the use of Flow-Matic, a pseudo-code program in English language which automatically prepares instructions in machine language. Flow-Matic is the first compiler program for business data processing, says Remington Rand Div, Sperry Rand Corp, which developed the program for its Univac data processing system. A companion compiler program, Math-Matic, also was announced which automatically will prepare from simple English algebraic statements the instructions for solution of engineering problems.

Flow-Matic will eliminate the coding phase of digital computer processing of business data. On the basis of two or three English language sentences, the program will prepare some of the most intricate coding necessary for data processing, such as input-output, matching and ending routines, and logical manipulations, that together represent at least 70% of all data-processing runs. The pseudo-code sentences can be prepared by a trained clerical employee or anyone with a knowledge of the business problem to be processed.

The companion Math-Matic compiler program is said to open the way to a wide range of computer applications in mathematics and engineering, while reducing pro-

(*Continued on page* 76)



B&O BITUMINOUS COALS FOR EVERY PURPOSE

Ask our Man! BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD. Phone LExington 9-0400

Flow-Matic Codes

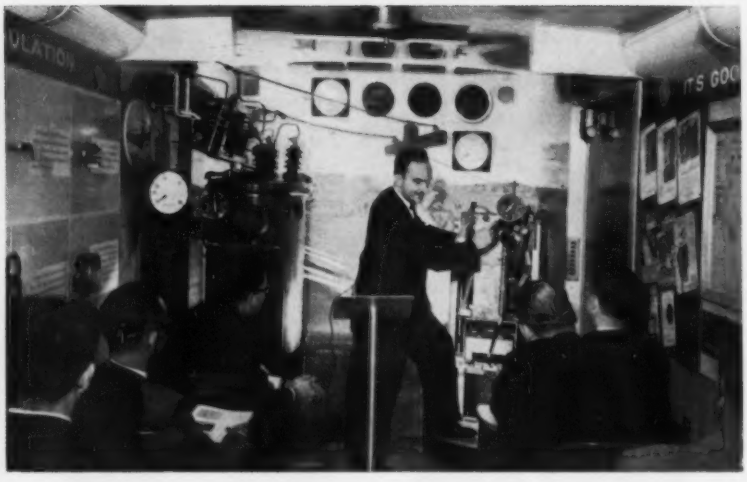
(*Continued from page* 74)

gramming and testing time significantly. The program is easy to learn and eliminates the step-by-step coding of instructions for Univac I and II. Time savings are significant, ranging up to 92-98% for some problems as compared with conventional programming.

SSE and IBM Present New Fuses, Data Process

• A line of power fuses in interrupting ratings in excess of 1.5 million kva is available from Southern States Equipment Corp, Hampton, Ga. Fuses will be in continuous current ratings up through 400 amp, and in voltage ratings as high as 230 kv. One feature is the reported ease and economy with which they can be restored to service after operation.

• A fully transistorized data processing system, known as the IBM 7070, is the first in a new line to be produced by International Business Machines Corp, New York. The design is said to provide higher storage capacity, and makes possible lower operating costs, lease or purchase price.



GE's Voltage Van Is on Midwest Tour

A custom-built, 10-ton, heated and air-conditioned vehicle with a full-sized operating model of a voltage regulator and a fully equipped classroom-theater seating 15 persons, will tour seven midwestern states for the General Electric Co. Called the Voltage Van, it is scheduled to visit utilities, municipal electric companies, and rural electric cooperatives in the next six months.

The van contains two operating regulators, each weighing more than 1,000 lb. One is connected to a model electric power distribution system on which changing electrical "loads" can be simulated, and the other is a core-and-coil assembly to show the interior features of GE's ML-32 line of step-voltage regulators. The van also has a screen for projecting slides and film strips, a lectern, and wall-mounted photos and display materials.

L-M Prepares First SRT for Shipment

Line Material Industries, Milwaukee, Wis., first self-regulating distribution transformer (SRT) is inspected by engineering and marketing executives prior to shipment. Rated 25 kva, 2,400/4,160 v, the unit is one of several hundred to be produced on a pilot production program. They will be allocated for testing under field operating conditions.

Shown left to right are, D. A. Manning, manager, Transformer Sales and Service; R. C. Kirk, manager of engineering for L-M Kyle products; A. G. Steinmayer, vice president of engineering; R. P. Thompson, manager of engineering for L-M transformers; and A. R. Waehner, director of transformer sales.

(*More Manufacturers News on p* 79)

There IS a Difference!

Connectors may look alike but it's PERFORMANCE that counts

BLACKBURN CONNECTORS OUT-PERFORM THEM ALL

Because They Are . . .

BETTER MECHANICALLY

- Made of high strength duronze, a silicon bronze alloy stronger than structural steel.
- Machine cut threads, *CFC treated, provides more thread engagement —reduces friction and increases thread efficiency. *Chemical Friction Control.
- Rigid inspection of each production operation assures uniformly good connectors.

BETTER ELECTRICALLY

- High clamping force—the result of greater thread efficiency breaks down oxide on the conductor improving conductivity.
- Higher initial conductivity, actually greater than an equal length of conductor is maintained permanently.

REUSABLE

- Selection of proper high-strength, corrosion-resistant materials—plus precision workmanship and inspection—means Blackburn connectors may be used over and over.

BLACKBURN *Hi-Strength* CONNECTORS

AVAILABLE AT ELECTRICAL WHOLESALERS EVERYWHERE

JASPER BLACKBURN CORP., 1525 Woodson Rd., St. Louis 14, Mo., WYdown 3-9430

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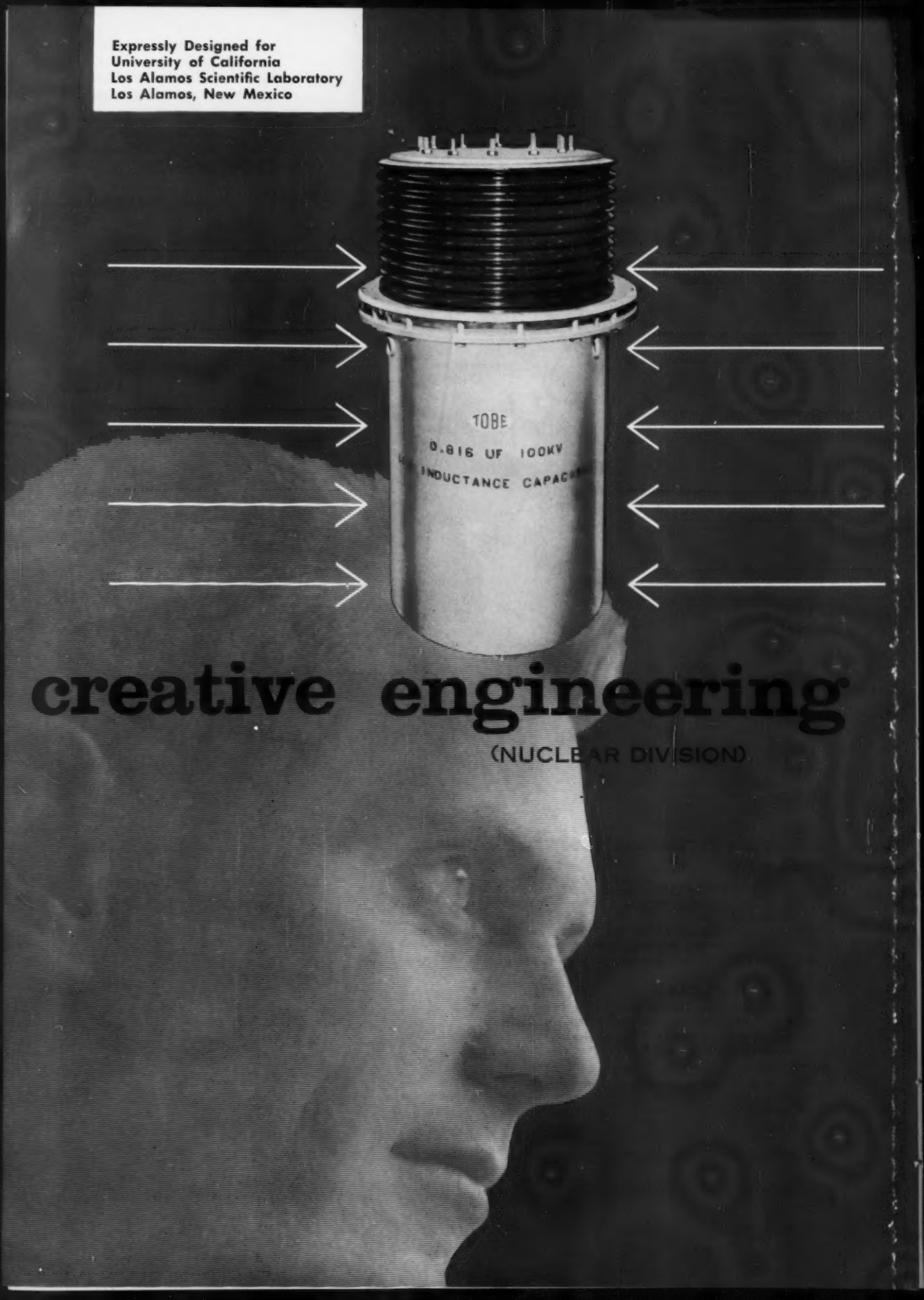
University of California
Los Alamos Scientific Laboratory
Los Alamos, New Mexico



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(NUCLEAR DIVISION)

Tobe NRG-200 Series Energy-Storage Capacitor

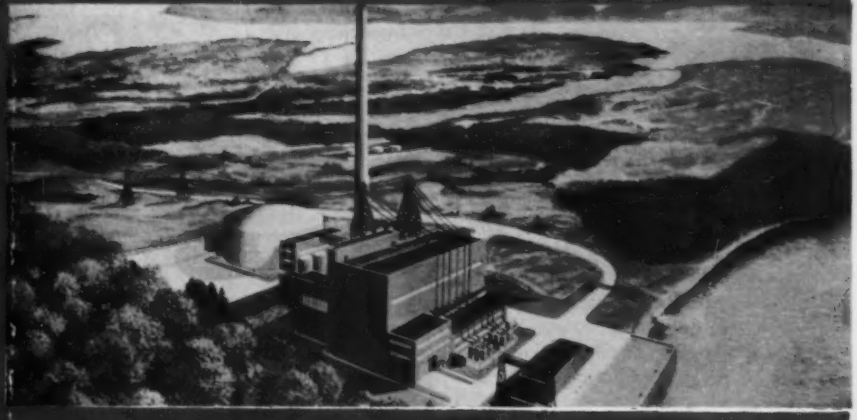
BUILDING CAPACITORS that can develop a peak surge of 20,000 megawatts takes intimate knowledge of capacitor physics and capacitor manufacture. Security regulations prevent our detailing the many projects in which Tobe is pioneering in the exacting area of thermonuclear energy-storage capacitors. (Utility research engineers are now investigating the thermonuclear "pinch" technique as a possible source for continuous electric power.)

Tobe 50 KVAR Power Capacitor

It was Tobe's long experience in building power capacitors that made it possible for us to develop capacitors capable of handling unprecedented peak loads. So, whether you need a bank of 50 KVAR's—or a bank of thermonuclear energy storage capacitors—talk to Tobe.

Tobe Deutschmann Corporation, Norwood, Massachusetts.

in action



THE "FUTURE" IS HERE... in this architect's rendering of the Indian Point, N. Y. nuclear power plant now being erected on the Hudson River 40 miles north of New York, by Consolidated Edison.

TOBE TEMPALL CAPACITORS

Since 1914 pioneered, manufacturing, engineering, rigid production standards.

A-C Ships Two Large Condensers to Utilities

Two large condensers recently shipped by Allis-Chalmers Mfg Co, Milwaukee, Wis., were:

• A 198,000-sq ft condenser—two 90,000-sq ft units for a 450-Mw, 3,500-psi, turbine-generator, and an 18,000-sq ft unit for the boiler feed pump drive turbine—shipped via rail. They will be installed at Breed Plant Unit No. 1 of the Indiana & Michigan Electric Co near Terre Haute, Ind.

All condenser units will have the tubes welded to the tube sheets.

• A 170,000-sq ft condenser for a 320-Mw generator shipped by Great Lakes freighter instead of rail.

Detroit Edison Co had ordered two 170,000-sq ft condensers, one each for Units No. 5 and No. 6 at the St. Clair power plant. The utility specified that the exhaust neck be shipped in one piece. This meant the piece was too big for rail shipment. A-C then shipped the shell, as well as the neck, by freighter.

This first condenser is for Unit No. 5, which is scheduled for operation in early 1959; the other is scheduled for Unit No. 6 in 1961.

German 660-Mva Bank

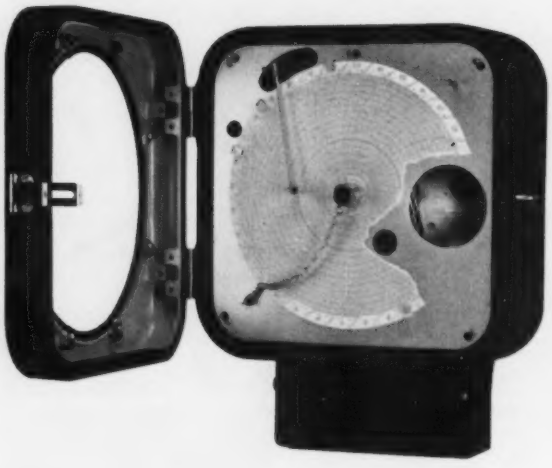
A three-phase transformer bank rated 660,000 kva consisting of 3 single-phase, 220,000-kva, 400/231/30-kv transformers with TCUL regulation ± 18% on the 230-kv side has been built by Brown Boveri of Switzerland. Each transformer has a tank of a Schnabel car design and with the radially laminated core permitted shipment of a completely assembled unit. The bank was connected with the first 400-kv line of the West German system.

Elliott Supplies 54 Motors

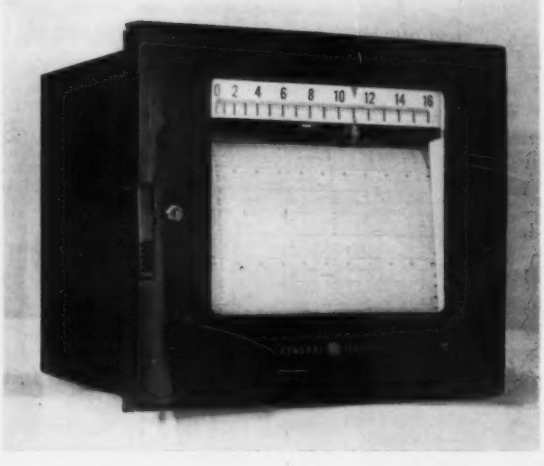
A line of 27 800-hp, 225-rpm synchronous motors, built by the Elliott Co, Ridgeway, Pa., helps to grind unprocessed taconite ore into usable sinter for blast furnace charge. These motors serve the line of rod mills and 27 Elliott 1,250-hp, 225-rpm synchronous motors drive a line of ball mills. These machines do preliminary and secondary grinding of the taconite.

New Equipment

Graphic Meters . . .



. . . with synchronous-carryover drive mechanism stay on time during power interruptions up to 14 hr. These Lincoln meters also record the number and time of outages. Carryover power for the chart mechanism is supplied by a clock-type mainspring and escapement, which is automatically rewound by the synchronous motor after an outage. A friction clutch between the motor and mainspring prevents stalling when the spring is fully wound. The synchronous carryover gear train is interchangeable with existing Lincoln graphic meters.
Sangamo Electric Co, Springfield, Ill.



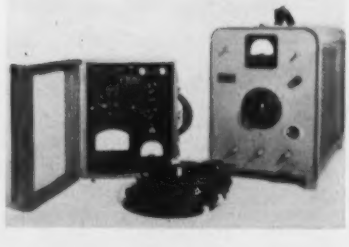
Recorder-Controller . . .

. . . has continuous, automatic standardization. This null-balance, strip chart instrument is offered in a d-c potentiometer, a-c or d-c bridge version, for measuring and recording watts, vars, p.f., and frequency. Line includes type HF single pen and type HG multi-record models. Calibrated chart width is 10¾ in. Instruments have unitized construction. All major components are mounted on rear of mechanism panel which swings out through 160-deg arc for servicing.
General Electric Co, Schenectady 5, N. Y.

Telemetry System . . .

. . . for central station use in telemetering tie-line power, total station generation, and load frequency intelligence, is a tubeless, frequency type design. Comprising a transmitter and receiver, it can be used on any type of communication channel. Transmitter converts mv signal of sensing element to current and translates this into a transmittable frequency which is a measure of the original variable. Receiver converts frequency back to current or mv for recording and control. Separate mv-to-current and current-to-frequency units permit wide flexibility of input. Accuracy is ±¾% from 30 to 120 F ambient. Linearity is within 0.1%. Unit has 5-15 cps or 6-30 cps frequency band, low power use, modular plug-in construction, and has a signal failure relay in all receivers.
Minneapolis-Honeywell, Wayne & Windrim Ave, Philadelphia 44, Pa.

Micro-Ohmeter Test Set . . .



. . . checks condition of oil and air circuit breaker contacts and current paths from bushing terminals without disassembling. It can also be used to detect abnormally high resistance paths in cable joints, bus bar connections, and other power equipment where normal resistance is in microhm range. Resistance values as low as one microhm can be measured within 2% accuracy. This portable set comprises Model 151-S

(*Continued on page* 82)

this man is changing taps *faster . . . safer . . . more economically!*

Take a good look at this lineman. He's changing taps alright, but his hand's *not* inside the tank, exposing the oil to contamination. And if you look closely, you'll note the absence of a hand-hole cover, thus decreasing the danger of tank breathing.

Take a good look. Note how low on the pole he is, well out of danger, and the taps will be changed in no time at all. All he has to do is remove and reverse the cap, then use it as a handle to make the setting. This saves time, which saves his employer money.

Finally, since his hand's not down inside the tank, this lineman can *see* what he's doing, so there'll never be any question in his mind about the tap setting!

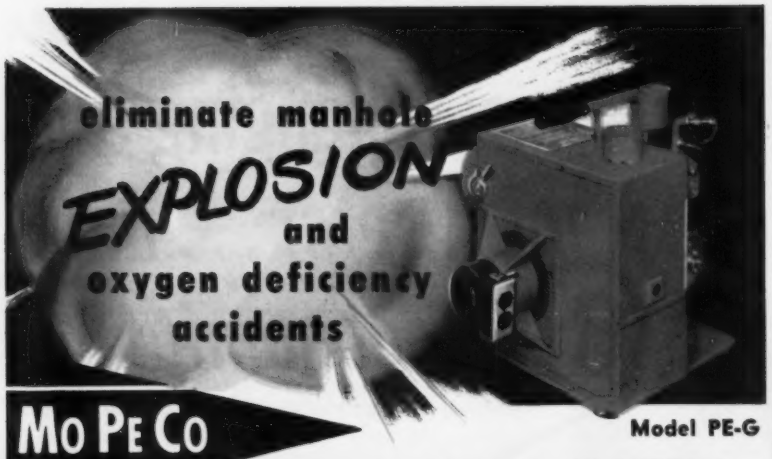
This man is changing taps the thoroughly tested and proven R T & E way, with the industry-famous R T & E Externally Operated Tap Changer. Costly, time-wasting, and dangerous steps in changing taps have been completely eliminated.

Ask your R T & E representative to demonstrate this Tap Changer. Or write for further specifications.

ENGINEERING TALENT CONCENTRATED ON ONE IDEA
A BETTER TRANSFORMER

RT&E CORPORATION

WAUKESHA, WISCONSIN • PORTLAND, OREGON



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Model PE-G

VENTILATING HEATERS

give you fresh air • heated fresh air • light ...in one portable unit!

- 300 to 800 cfm fresh air
- 10° to 96° temperature rise
- 300 watt DC generator
- Weighs only 78 pounds
- Propane or Butane fuel
- Safe fresh air blown into the manhole at all times.

Order through your favorite distributor

Write or call
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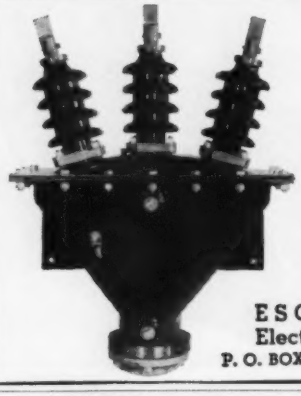
Denver, Colorado
2256 So. Delaware St. RAce 2-2834



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In All Standard Body Shapes—and Sizes to 15000 Volts.

Detachable Porcelain Potheads at Cemented Porcelain Prices.

Write for Prices—and Delivery. Both are better than most.

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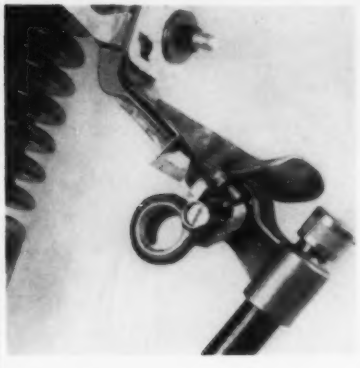
Micro-Ohmeter Test Set . . .

Microhm meter plus transistor-type Model SM rectifier for supplying both a 10-amp and 100-amp d-c current source. In addition, self-contained 10-amp battery permits use where power lines are not available or de-energized.
J. W. Dice Co, Englewood, N. J.



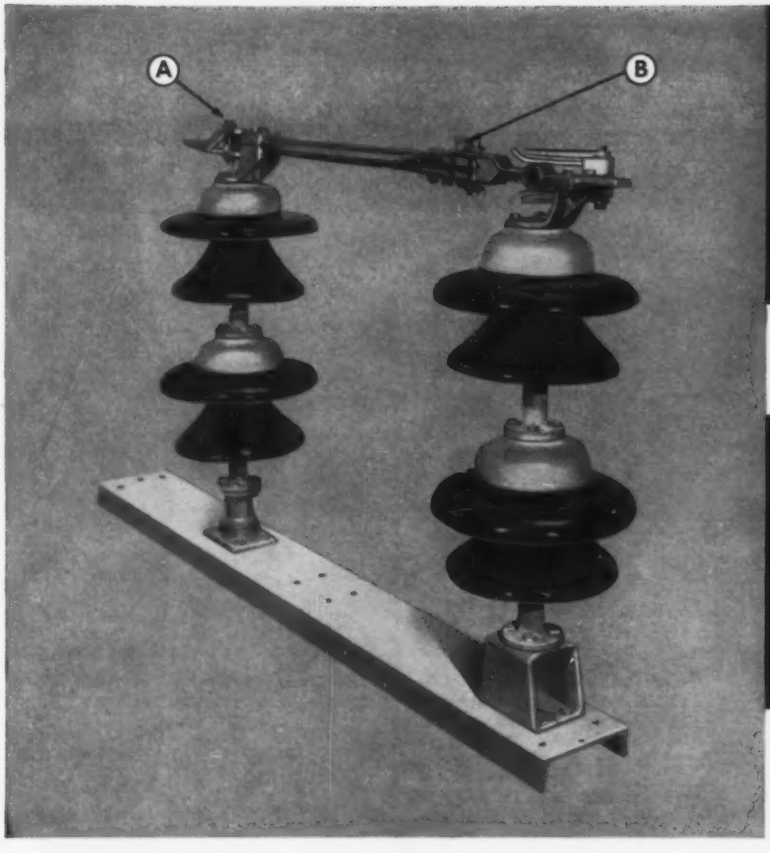
Open Cutouts . . .

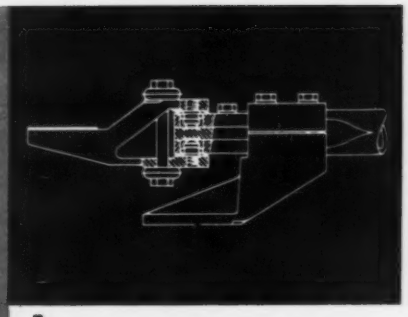
. . . can be used for load breaking. When cutout is opened in normal manner, load current arc burns the end off a small replaceable cylinder of insulating gas, which extinguishes the arc. Full rated load is interrupted in two cycles or less. Cylinder is independent of overcurrent protective function of fuse link. Any conventional switchstick can be used to open cutout. These load break cutouts are available in ratings of 7.8 and 15 kv, 100 amp for fuse cutouts with heavy duty and extra heavy duty interrupting ratings, and 200 amp for units with disconnect blade.
General Electric Co, Schenectady 5, N. Y.

Ultrasonic Cleaner . . .

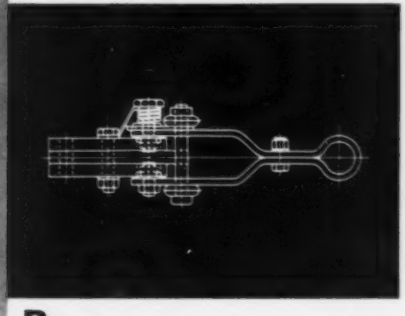
. . . has 5-gal processing tank. Measuring 14x9x10 inches, this stainless steel tank has two drain connections for recirculation of process liquids. It is powered by GU-420 generator with 400-w continuous output at 20 kc. Transducer elements are constructed mainly of solid metal sections.
General Ultrasonics Co, 67 Mulberry St, Hartford 3, Conn.

(*More New Equipment on page* 84)





A NEW-DESIGN SWIVEL TERMINAL. With pressure right on center of rotating insulator, swivel operates with exceptional ease to prevent torsional resistance from line wires.



B KNEE-BREAK BLADE CONTACT provides high-pressure toggle action without putting extra burden on swivel terminal. Maximum operating ease is assured with this combination of swivel and blade contact.

GET MAXIMUM EASE OF OPERATION WITH PMB-40 BRAIDLESS SWITCHES

high-pressure contacts... minimum space requirements

Delta-Star Braidless Side-Break Switches bring the advantages of the popular MK-40 vertical-break switch to applications where ground space and overhead clearances are limited.

Braidless swivel terminals operate with the high-pressure joint directly on the center line of rotation, eliminating drag on conductors during switch operation. Knee-break blade principle provides easy entrance and withdrawal of blade from high-pressure contacts. Large deflections, as on the MK-40, assure uniform, long-life contact pressure.

Ratings are available from 7.2kv to 161kv in 400, 600, and 1200 amperes, with load-interrupting and arc-suppressing attachments on ratings to 69kv. Other horizontal-break models made with center break and double side break.

Call your Delta-Star representative or write for Publication 5604. *Dept. 116, Delta-Star Electric Division, H. K. Porter Company, Inc., 2437 Fulton Street, Chicago 12, Illinois. District offices in principal cities.*

H. K. PORTER COMPANY, INC.

DELTA-STAR ELECTRIC DIVISION

Connors Steel, Delta-Star Electric, Disston, Forge & Fittings, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside-Alloy Metal, Vulcan-Kidd Steel, H. K. Porter Company (Canada) Ltd.

YOUR ASSURANCE OF HIGH QUALITY, LONG LIFE AND LOW COST

Close laboratory control over each step in manufacture has established Crapo Galvanized Steel Strand as a product of highest quality and dependability. You benefit through longer service life and lower ultimate costs.

Heavy, uniform, tightly-bonded coatings of commercially pure zinc, applied by the famous Crapo methods, withstand the punishment of construction, provide maximum resistance to corrosion and contribute to over-all economies.

For OVERHEAD GROUND WIRE . . .
CRAPO Weldless Galvanized Steel Strand

The most practical and economical strand for shielding transmission lines against lightning. Maximum strength and high fatigue endurance, inherent in Crapo Weldless Strand, provide that extra safety factor so important in overhead ground or static wire.

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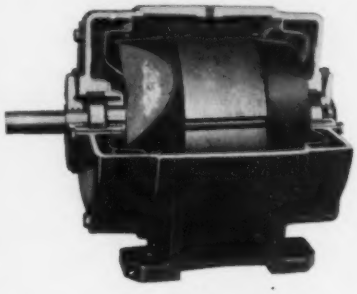
Crapo Galvanized Steel Strand. Made to highest standard specifications . . . a size and breaking strength to meet all practical needs.

Contact your jobber or write for descriptive folder.

INDIANA STEEL & WIRE CO., INC.
Muncie, Indiana

Encapsulated Motor . . .

. . . for cooling towers and other applications subject to severe outdoor service has open-type stator, completely cast in epoxy resin. Winding end turns are impervious to moisture and resistant to solvents, oils,

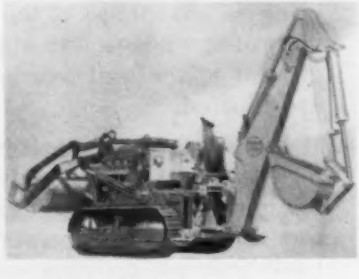


and most common chemicals. Conductor, phase, and slot insulation may be Class A, B, or H. This Super-Seal epoxy resin encapsulation is available in all integral-hp frame sizes in which random-wound coils are used.

Allis-Chalmers Mfg Co, Milwaukee 1, Wis.

Crawler-Backhoe-Loader

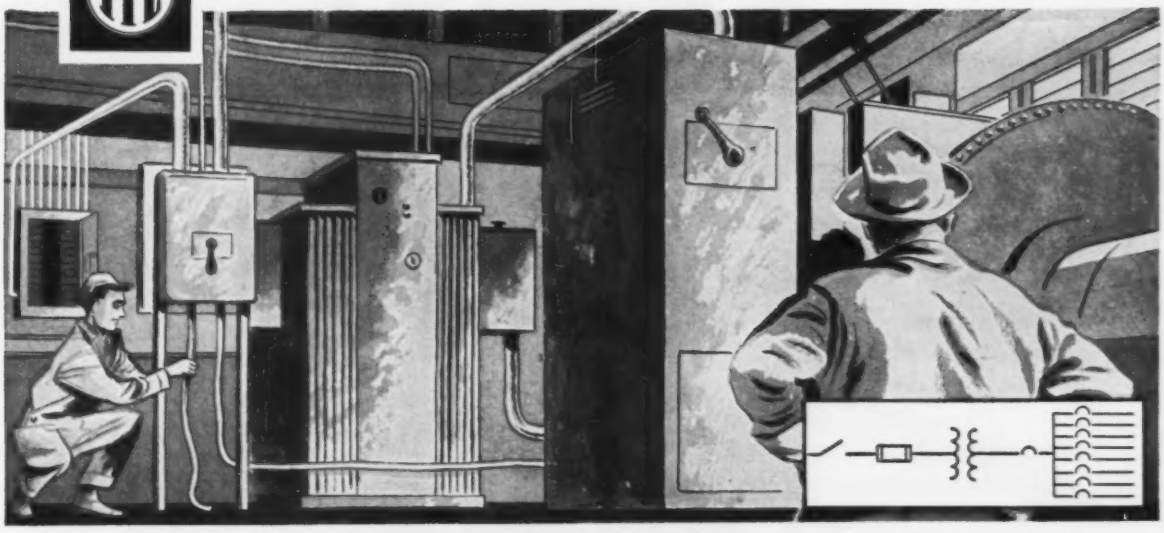
. . . digs trench 12.5-ft deep, reaches more than 16 ft from its pivot, and swings 180 deg. Foot-operated swing cuts cycle time by leaving operator's hands free to work bucket levers. The 5/8-yd front-end loader on this Model 310 has 4,300-lb breakaway, lifts 2,600 lb, and clears almost 9 ft with bucket dumped.



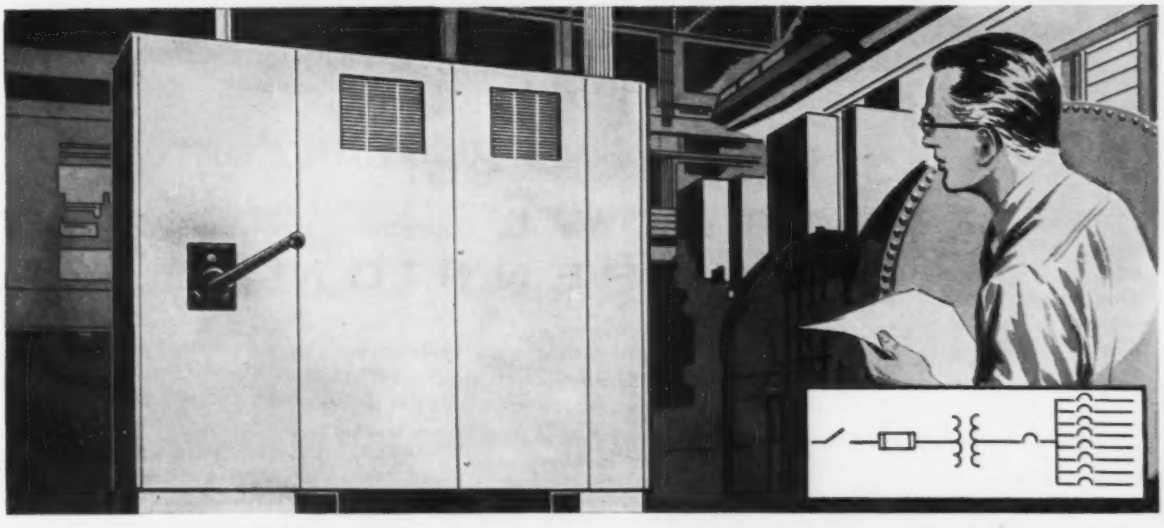
Adjustable digging depth stops keep operator from making too deep a cut. Basic tractor develops 30 drawbar hp and up to 5,690 lb pull or push power. A 19-gpm tractor-mounted pump supplies 1,600-psi hydraulic power for backhoe and loader.

J. I. Case Co, Racine, Wis.

TRANFO-UNITS



WHY BUY AN EYESORE?



A TRANFO-UNIT COSTS NO MORE

It's neat, compact and completely self-contained—a practical, economical way to bring in your electric power at the low-cost higher voltage. You get the transformer, primary disconnect, and secondary protective devices all included in one neat, safe package.

The I-T-E Tranfo-Unit costs no more than hodgepodge arrangements of assorted gear. But it's so much more satisfactory. You place one order . . . that saves time and trouble. It comes complete . . . that saves extra engineering. It's delivered in one piece . . . that saves installation labor.

For supermarkets, schools, office buildings, factories and many other applications, the I-T-E Tranfo-Unit is ideal. Available in a wide range of capacity ratings. Get all the facts now. Write I-T-E Circuit Breaker Company, Transformer & Rectifier Division, 19th & Hamilton Sts., Philadelphia 30, Pa.

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NEW FROM VICTOR!

NO. 961 FOGBOWL SUSPENSION

Specially designed for fog and smog contaminated areas, this brand new product of VICTOR research was created to satisfy a critical need. The new No. 961 suspension has the *lowest* leakage current and the *lowest* radio interference level of any other type or make of fogbowl suspension insulator used in contaminated areas.

Low surge and leakage currents contribute to many desirable advantages of this insulator—particularly the elimination of wood cross-arm burning. These exceptional features have been proved not only in VICTOR'S own electrical laboratory, but by extensive service on lines in locations where contamination is a serious hazard.

If your service depends on protection against fog, smog and industrial contamination, here is your answer—VICTOR'S new No. 961 Fogbowl Suspension. You can't buy better—at any price!

VICTOR INSULATORS DIVISION

I-T-E Circuit Breaker Company

Electrical World is using the MANAGEMENT NEWSLETTER this week to present substantially all of the text of a recent speech by Clyde Ellis, general manager, National Rural Electric Cooperative Association. Although we carried a summary of the speech in the Sept. 22nd issue (p 95), we believe that all members of the industry should read this text. We believe it is very important for public power and electric cooperative members, as well as power company representatives, to read and understand the drastic nature of the national policies which Ellis proposes, and his methods for promoting them.

Clyde Ellis' attempts to build a case for his program, the program itself, need to be placed in full view. We welcome publishable comments.

The "Little Old Man" is a reference to the late John Hobbs, an early prominent figure in rural electrification circles. The introduction referring to him has been deleted to save space. There have been other similar deletions, but none referring to Ellis' proposals.

'The Little Old Man and a Little Old Plan'

The Master Plan to Destroy

Today, America is faced with a Master Plan, master minded in Wall Street and spearheaded through the White House, to destroy its rural electrification program. Rural Missouri has already suffered and stands to suffer a great deal more. And when *rural* Missouri suffers, every business in the state that is not in on the kill suffers.

Bear in mind that there are still over half-a-million farms and rural establishments in the country unable to get electric service. Bear in mind that a third of a million farms and rural establishments once served are now idle—many thousands of them in Missouri—and that those still served are going to have to subsidize Uncle Sam by repaying also the nearly $200-million that it cost to build those now-idle services. When Congress decided to require REA borrowers to serve everyone in their service areas, whether they could pay their own way or not, that was a social decision, not an economic one.

And bear in mind, too, that farmers and other rural users of electricity in Missouri and in the nation are doubling their use of power about every five years—all within the areas they now serve—for unlike the power companies they can't serve anyone who is already served.

The power industry is the fastest growing major industry in America, but the rural electrics are increasing their consumer-sales of power even faster.

In order to keep up with the demand, the co-ops are having to build larger lines, larger transformers and substations and generators at the rate of over $300-million of new construction a year. They are paying off the old loans, with interest, but they need more than a million dollars a working day of new capital. If this seems a lot of money, let me add that the rural electrics are paying out about $½-million a day now for wholesale power—about half of that to the power companies. And if this seems like a lot of money, let me add further that the five million consumer families and rural establishments of the rural electrics are investing over $1-billion a year in refrigerators, freezers, hot and cold running water, radio, TV, air conditioning, sprinkler irrigation and the 400-odd uses of electricity in rural America.

Let me now document for you a few elements of Wall Street's incredible Master Plan, aided by Dwight D. Eisenhower, Sherman Adams and Ezra Benson, to destroy the REA program:

February, 1955—The Hoover Commission's power-company oriented Task Force on Government Lending Agencies made its report to Congress containing four recommendations regarding REA—all of which had long been urged by the power trust monoply:

1. That REA be placed under the supervision of a general credit agency within the Depart-

ment of Agriculture;

2. That REA interest rates be increased to an unrealistically high figure, so as to cover the so-called long-term cost of money to the Government, the costs of REA administrative services, and credit losses (even though there have not been any);
3. That the rural cooperatives be required to accumulate equity capital faster; and
4. That the cooperatives be forced to seek their future loan funds from banking and other financial institutions and not the Federal Government.

Here we have the initial outline of the *Master Plan,* Master Minded in Wall Street.

Budget Director Steps In

Now note the effort to carry it out:

June, 1957—The Director of the Bureau of the Budget transmitted to Congress proposed legislation to carry out the high interest rate recommendations of the Hoover Commission Task Force. It's the Capehart-Heistand Bill, designed to drastically raise the cost of financing for REA borrowers in the exact three ways suggested in the power-company directed Task Force recommendation.

Reliable studies indicate this bill would increase interest costs to REA borrowers to between *two and three times* the present rate. It would cause rural electric member-consumers' power rates to be raised substantially.

Now, take Task Force Recommendations Nos. 3 and 4 dealing with REA financing. The objective is a reduction or elimination of REA loans and the establishment of a plan for giving the REA lending business to Wall Street:

January, 1958—In his budget message this year, President Eisenhower asked Congress for new REA loan authorizations for fiscal 1958 amounting to only $150-million. This was less than half what everyone—REA and NRECA included—testified would be needed.

Here is what President Eisenhower told the Congress January 5, 1958:

> *"In this budget I am recommending important revisions in our . . . rural credit programs (including REA) to place them on a sounder long-term basis with less reliance on the Federal Treasury. These revisions will result in only moderate reductions in budget expenditures in the fiscal year 1959, but should result in more significant reductions in 1960 and later years."*

In other words, next year and thereafter, we would have to go to Wall Street for *not half, but all,* of our loans. And we are fairly certain we could not get from Wall Street at any reasonable price the funds that we require for new and larger facilities each year.

No one representing REA or USDA or the Budget Bureau or the President subsequently asked Congress to increase the President's $150-million loan authorization request in order to meet the cooperatives' loan needs for next fiscal year. This burden was left entirely to the rural electric systems, through their NRECA, and to other friendly organizations. Fortunately, we were not caught off guard, and got $317-million in new loan authorizations for this fiscal year, thanks to an understanding Congress.

February, 1958—Before Congress could pass on Ike's budget recommendation, the Administration asked Congress to change the REA Act itself so that the other half of the loans needed would have to be obtained from private lenders, if possible. Secretary Benson submitted this anti-REA legislation to Congress exactly as he and the White House wanted it passed.

July, 1958—On July 21, less than a month ago, the Comptroller General of the United States became the admitted tool of power company representatives and signed an eight page ruling to the Secretary of Agriculture saying that for 22 years the REA Act had been misinterpreted, that the words unserved "person" in the law means unserved "area". He says it was not intended that loans should be made to serve "an *area* already served by private power companies when such companies are willing to provide adequate central station service to person within the area who are not tied to the power lines."

In other words, the Comptroller General has ruled that even though persons are not able to get service from a so-called private power company that is serving in a general area where they reside, but which says it is "willing" to serve them—usually only if they pay to it exhorbitant amounts to get hooked up—then, even under these circumstances, an REA loan cannot be made to serve these unserved persons.

How big is an area? The Comptroller does not say. Haven't the so-called private power companies always said they were *operating in all areas* and that they were *willing to serve all?*

There never would have been any REA loans under the Comptroller General's interpretation—and there wouldn't be any more. His ruling will have to be withdrawn because it is based on a false premise.

Accordingly, bit by bit our rural electric people in cooperation with their friends in the Congress and others, including friendly organizations, such as yours, have hammered out a little old plan of their own.

In order to put this plan of our own into proper perspective, it is necessary for us to keep in mind one significant fact: The power companies of the United States are not a part of our free enterprise system; they are franchised and certificated, so-called "natural monopolies", acting as agencies of the state, performing an essential public service, with many of the rights and privileges of units of government, including the right of eminent domain.

Here Is Our Plan

The Six Essentials:

There are six essentials of our electric cooperatives' existence and continued success:

1. *Dynamic Management*—which means progressively doing everything the most efficient way it can be done, including pooling their self-services wherever it pays.

2. *External Capital*—which means adequate loan funds at low cost, when we need them.

3. *Wholesale Supply*—which means adequate wholesale power at low cost when we need it, where we need it.

4. *Territorial Integrity*—which means full utility responsibility and opportunity to serve all within our service areas whom we are now serving and all the unserved within our service areas—and without piracy and invasion by others.

5. *A Decent Tax Rate*—which means that, since we operate in the relatively low income, thinly settled areas, our state and local tax rates, usually based on investment or gross revenue, should be lower than those of the profit power companies operating in the congested areas, and that we should *not* be forced to pay income tax equivalents on profits we don't make, as advocated by the National Tax Equality Association.

6. *A Decent Climate of Opinion*—which means that since both our consumer members and the general public have been saturated with unfavorable propaganda against our program, somehow we must now do a better job of telling our story to both our consumer members and the general public—our story not so much of the past, but of the *present* and the *future*, including all our problems and all the ways we benefit the whole economy and the whole society.

Our Blueprint for Counteroffensive

We cannot survive without any one of these six essentials. But we are more vulnerable on some than others. So let me give you our blueprint for the counter offensive in those areas where you can help:

External Capital:

1. *In order to preserve the type and cost of financing which has made the rural electrification program possible, we must counterattack—by exposing what is behind the Master Plan to destroy the program—by more effectively telling the truth about the power companies' predatory activities and the actions of those who do their bidding within the State and Federal Administrations.*

2. *We must continue our own further studies to show exactly what the Administration's Capehart-Heistand and Benson-Wall Street bills, the Comptroller General's ruling, and all their other anti-REA schemes would do to us; and*

3. *We must fight to pass the Humphrey-Price bill to restore to the REA Administrator the REA loan-making authority which Secretary Benson has taken from him.*

Wholesale Supply:

We must mobilize and get legislation:

1. *to set up machinery for cooperatives, municipally-owned electric systems and power districts to federate more easily for the construction and operation of their own generation and transmission systems—with REA loans available for that percentage of the total capital required to supply the REA distribution system borrowers.*

2. *to enable us to collect triple damages and all our costs where the public service power monopolies delay our efforts to generate, transmit or distribute our own power, as did the 10 power companies of Missouri in fighting our generation and transmission co-ops of Missouri.*

3. *to require State regulatory commissions, whether the co-ops are under their jurisdiction or not, to recognize the co-ops as citizens entitled to wholesale power service from suppliers in the area and to protection from power company excesses.*

4. *to make public service power company and municipal state and federal transmission facilities common carriers, like other franchised transportation monopolies, for the delivery of power from point to point at a fixed cost.*

5. *to launch a respectable Federal atomic energy program, with enough Federal atomic plants to prove which are the best types and models of reactors and establish costs.*

6. *We must broaden and strengthen our already vigorous support of full Federal development of our country's hydro-electric power potential—of a TVA self-financing bill, of the Trimble Bill to return to Congress the cost allocations of multi-purpose river projects, and of similar measures.*

7. *to enact Federal legislation to establish backbone Federal transmission grids, or to require others to build them, throughout the country, to be available to all who desire to sell or purchase power wholesale over them at a fixed cost.*

8. *to enact state and Federal legislation to require all public service power utilities to reveal who owns them by filing annually with the commissions of the states in which they operate and with the Federal Power Commission the complete list of the owners of their voting stock.*

Territorial Integrity:

We must mobilize and counterattack to get new State and Federal Legislation as appropriate:

1. *to prohibit any electrical supplier from taking away a consumer of another electrical supplier.*

2. *to make it unlawful and a felony for any franchised or certificated public service electric company to promote, propagandize or otherwise encourage any consumer-owned electric system to sell out its properties;*

3. *to eliminate the now unrealistic "1,500 population" limitation in the REA Act on the size of communities for which REA loans may be made;*

4. *to prohibit state regulatory commissions from imposing, or tolerating others to impose, any restrictions or penalties on the size and kind of load which a rural electric cooperative or power district may serve;*

5. *to authorize and permit the establishment of public power districts and a workable procedure for turning electric co-ops and all other non-government power facilities within the power districts' borders into such districts as might be necessary.*

Decent Climate of Opinion:

1. *We must launch a counter-campaign to prevent the power companies from shifting public opinion away from the true concept that they are public-service, natural-monopoly agencies of the state; not a part of the free enterprise system.*

2. *We must launch a campaign to emphasize that cooperatives are the middle-way and that they are free enterprise.*

3. *We must try to stop the public service power companies—by means already mentioned and by other*

means—from running high, wide and reckless with their advertising, their contributions to front organizations and their fabulous lobbying and political campaign expenditures.

4. *We must sponsor legislation, both state and national to outlaw lobbying and propaganda by what are in effect public service agencies of the state—without, of course, depriving individual owners of any rights to do so as they please at their own expense.*

5. *And we must emphasize that, unlike the profit power monopolies which by their very nature, must strive for an optimum of scarce supply, and high prices, we shall always strive even in our counterattacks, for an abundance of electrical generation and distribution at low cost by all suppliers.*

6. *In order to help the program by helping friends of the program who are in public office—and in order not to help the program's enemies—we must achieve better distribution among our members and the general public of the voting records and the records of other official actions of State Legislators; Members of Congress, State and Federal Regulatory Commissioners, and Governors and Presidents of the United States.*

7. *And finally, in case anyone missed the point, we might slightly hint that it may be about time to "clean up that mess in Washington" again.*

One final reason for us all working more closely is that the American farmer, like the Missouri farmer—and like the small businessman generally—is a vanishing institution. Farm folk are down now to about 11% of the total population. (We are serving more people in rural America today who do not derive their principal income from the farm than do so.)

This is also a reason for all of us working with our natural allies—our neighbors in a rural America that *is* growing, our towns people in rural America, and all consumer groups everywhere in the country.

I am happy to tell you that for about 8 years now more than 20 national organizations and many state organizations, including Missouri Farmers Association, have been working together through the Electric Consumers Information Committee to provide an abundance of low-cost power in the economy of our country. These organizations, including farm groups, cooperative groups, AFL-CIO and many of their affiiliated unions—and others—have met regularly in Washington, D. C., in an effort to keep each other advised and to coordinate our efforts to get good Federal power rural electrification legislation passed and to stop bad legislation in these areas. I urge your consideration of a similar group working together within the great State of Missouri—as I would urge in all other states—but Missouri is a principal state in the rural electrification program, Missouri has been a leader in progressive farming, and we look to Missouri for new and better things—for dynamic leadership.

Fred Hinkle, as President of the Missouri Farmers Association; J. V. Minor and Julius Helm, as President and Executive Manager of the Missouri State Rural Electrification Association; and Ernest Wood as Missouri Director of the National Rural Electric Cooperative Association and all the fine people who work with them, constitute one of the ablest and best teams for this purpose in the country—but they need more help, and more organized help, from the consumer members of the rural electric systems, from the members of all farm organizations and from all other organizations which will work with them.

NRECA Minutemen

To show you that we mean business about increasing our efforts within the rural electric cooperatives, let me point to just one of our several new far-flung efforts to mobilize the millions we serve for action. Less than a year ago, after exhaustive studies, we launched what we call the Rural Electrification Minuteman Program. We called for 10,000 volunteers of farm and other rural leaders residing within the areas served by the approximately 1,000 rural electric systems in 44 states and Alaska. These volunteers, like the Minutemen of colonial times, would be ready on a minute's notice to go into action for the defense and advancement of the rural electrification program. They would supplement and assist the regular army—the several thousand rural electric system directors, managers, employee, and attorneys.

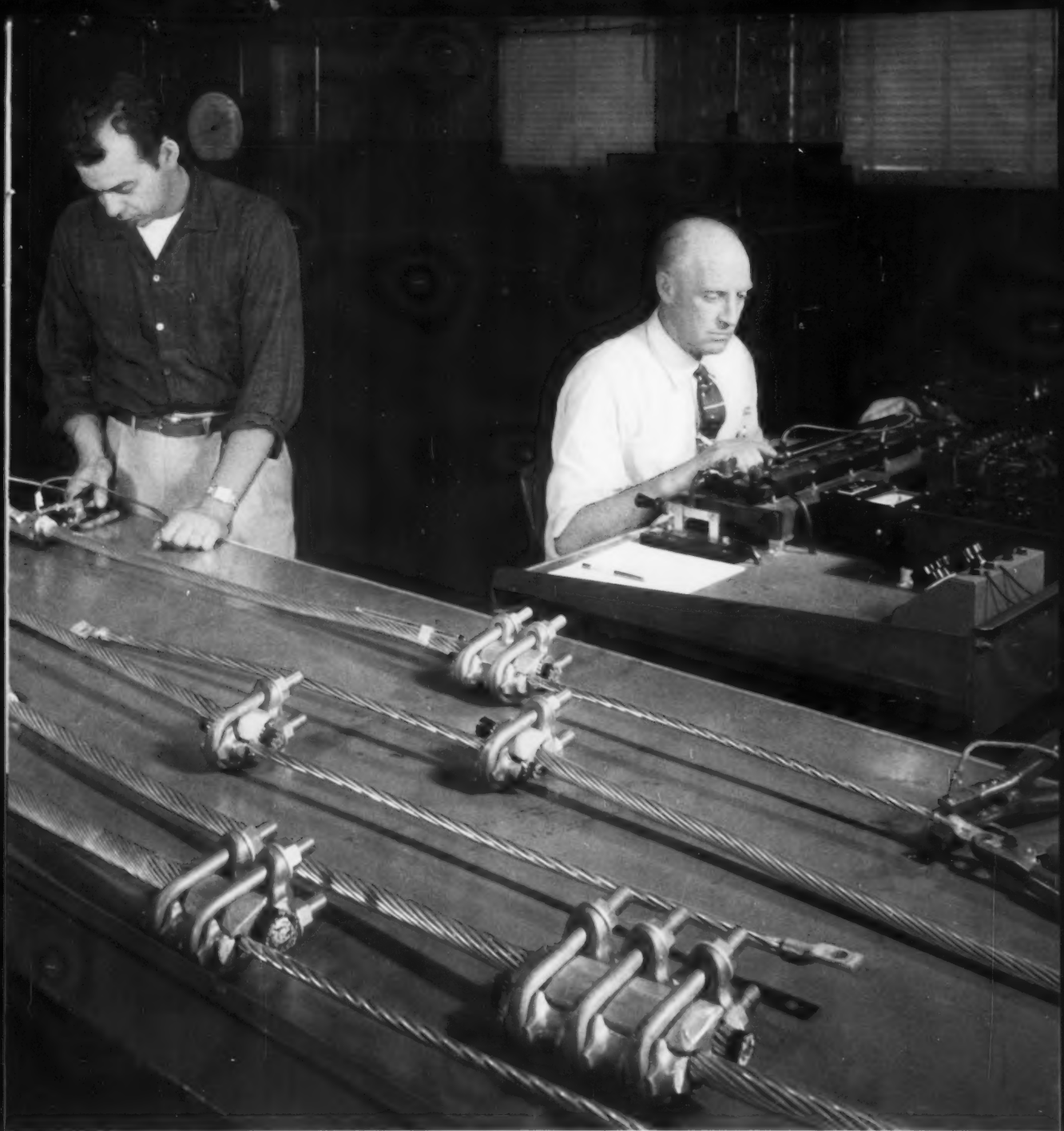
We in our national office would publish *this Minuteman Newsletter* for them. It would be subscribed to by their rural electric system. It would be mailed to them every week out of the Washington office while Congress is in session and periodically when it is not. The Minutemen would work constantly to keep their neighbors advised about the problems and opportunities of the rural electrification program. The Minutemen would work with all other groups in their areas. They would speak before civic and other groups at every opportunity to talk about the problems and opportunities of the rural electrification program. They would contact members of the Legislature and Congress and other public officials on behalf of the program as the need would arise. The local rural electric systems would call these Minutemen together periodically and would call on them to act, on a minute's notice.

We have now reached our first goal of 10,000 Minutemen who are already in action. Our National Board has just doubled that goal so that we are now driving for *20,000 of these Minutemen leaders by early 1959*. Our utimate goal is *100,000 Minutemen. We do mean business.* We mean to make the rural electrification program just as efficient as possible in terms of achieving both economic efficiencies of organized management and the political protection which little businesses can achieve only through dynamic organization.

How Shall We do It?

We shall do all this—and more if necessary—by keeping the faith and working as we have never worked before—by organizing as we have never organized before—to tell the story of our problems and our opportunites to all people of good will and to solicit their sympathetic understanding and active support.

Together, we can revive that "Little Old Man of Arkansas" in the spirit of many millions; we can blueprint our own "little old plan"; and, with your help and the help of a just Creator, we can counterattack with a worthy offensive that will leave Wall Street gasping, as it has gasped before and will gasp again.



The electrical resistance of Alcoa connectors is carefully measured before heat cycle tests in one of the many development operations at Alcoa's Massena, New York, facilities.

ALCOA
RESEARCH
. . . development today for tomorrow's loads

HOW ALCOA DEVELOPS MODERN CONDUCTOR ACCESSORIES

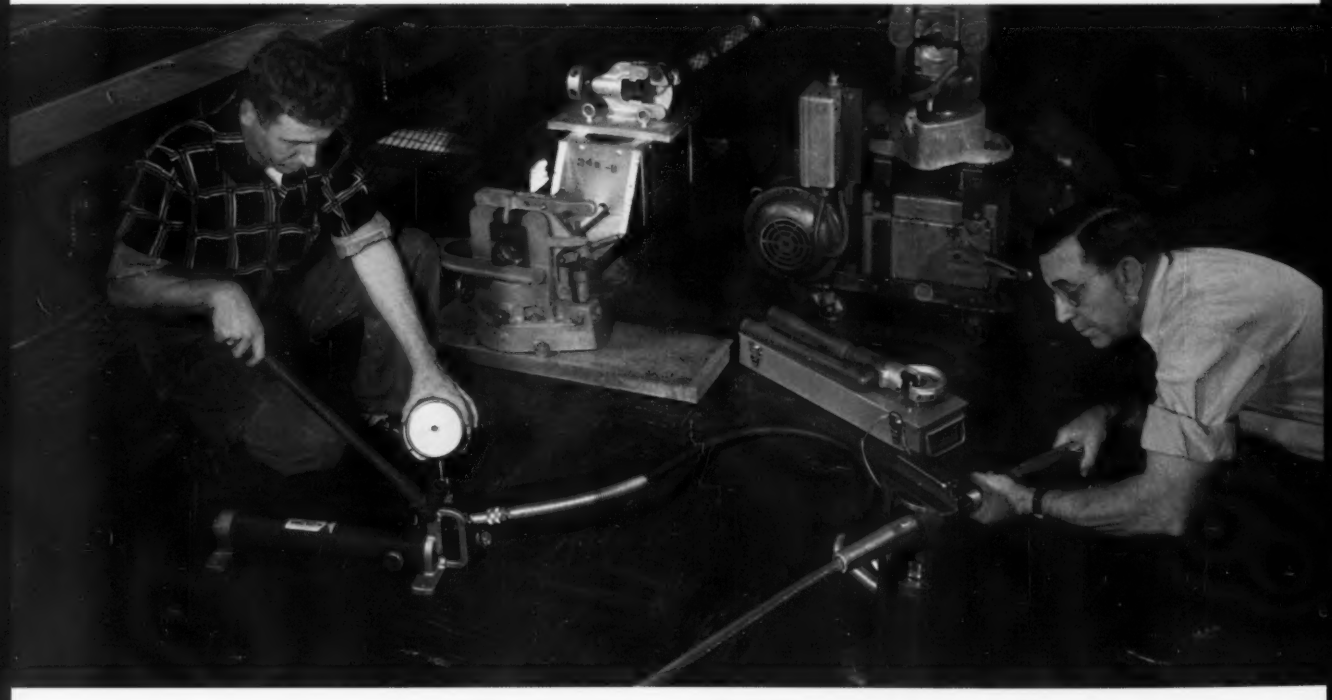
ALCOA RESEARCH

DEVELOPS EFFICIENT UNIVERSAL CONDUCTOR ACCESSORIES WITH TRADITIONAL DEPENDABILITY

With the sale of the first reel of conductor over 60 years ago, Alcoa immediately began work in another important field: accessories and tools.

As a result, Alcoa pioneered a complete line of connectors and clamps, dead-ends, joints, compressors, come-alongs and other tools. Constant research into the problems of conductor vibration led to the development of armor rods and Stockbridge dampers. Installation and maintenance of aluminum conductors have become easier and less costly through the years, and research for new and better accessories continues.

Typical of Alcoa's constant effort toward this end is the 580 series parallel groove clamp. For years, Alcoa's U-bolt clamp had given dependable service. But Alcoa engineers were seeking a clamp with a universal groove that would reduce the large number of different sizes required, without sacrifice of electrical efficiency.



Measuring the thrust required to close dies in development test on new Alcoa tubular accessories and compressor dies.

To find such a groove, a wide variety of geometric shapes were studied in special test plates. Each groove was evaluated against the known high performance standards of grooves made to fit each conductor. Low initial resistance and stable operation were demanded as characteristics of the shape Alcoa adopted.

Incorporating the new groove into practical designs led to testing of large numbers of prototype connectors. Special mechanical tests checked stresses. Other laboratory and field tests were used to evaluate the design. Clamps underwent 1,000 heat cycles with currents producing conductor temperatures as high as 200°F.

The result of all this testing and checking was the deep groove and pusher shape of the new Alcoa 580 series clamp, which has brought convenience to utilities. With this data and test background, plus immediate market acceptance, Alcoa has extended this design to the extruded "no loose parts" clamps, as well as terminals and tee connectors.

ALCOA ALUMINUM
ELECTRICAL CONDUCTORS AND ACCESSORIES
ALUMINUM COMPANY OF AMERICA

ALCOA RESEARCH

. . . development today for tomorrow's loads

Sand mold for aluminum castings of new 580 series universal groove clamp.

An order for new 580 series clamps is filled from Alcoa's accessory warehouse at Massena.

ALCOA RESEARCH

ASSURES FURTHER PROGRESS IN CONDUCTOR ACCESSORIES

As the electrical industry has grown, Alcoa research facilities have grown right along with it. By 1948, this phase of Alcoa's activities had expanded to such an extent that a special division was set up, known as the Electrical Engineering Division of Alcoa Research Laboratories.

At these laboratories in Massena, work is carried out on all problems involving the use of aluminum in electrical conductors and accessories. Tests are made under conditions as similar as possible to those encountered in the field. Expanded ACSR, aluminized steel core wire, welded aluminum bus fittings, basic vibration data, sleet melting techniques, armor rods and Stockbridge dampers are only a few of the many important results. With these facilities, Alcoa continues its efforts to supply the electrical industry with the most modern and efficient conductors and accessories at the lowest possible cost.

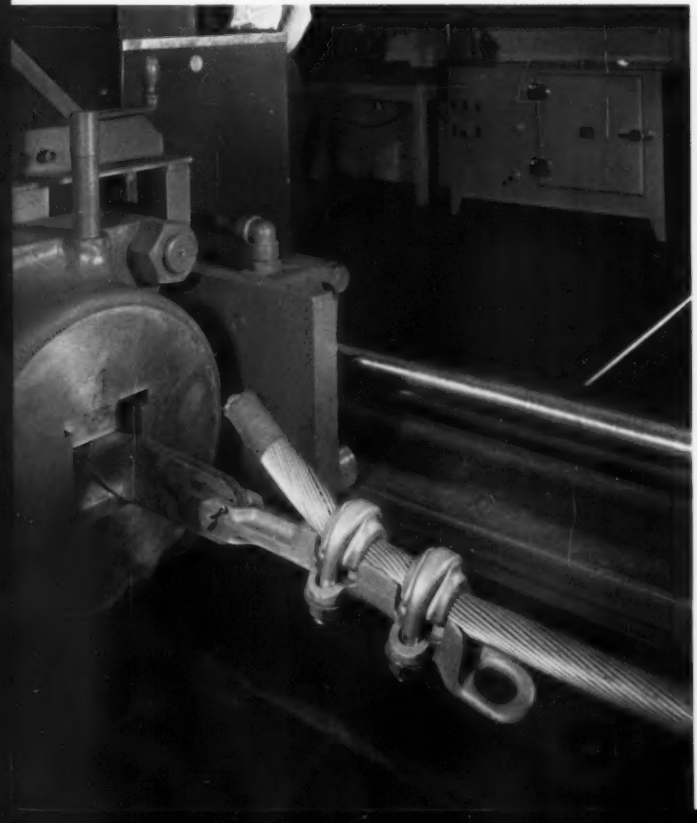
Below left: Testing the holding power of 220 series distribution dead-end clamp in Alcoa's physical testing laboratory.

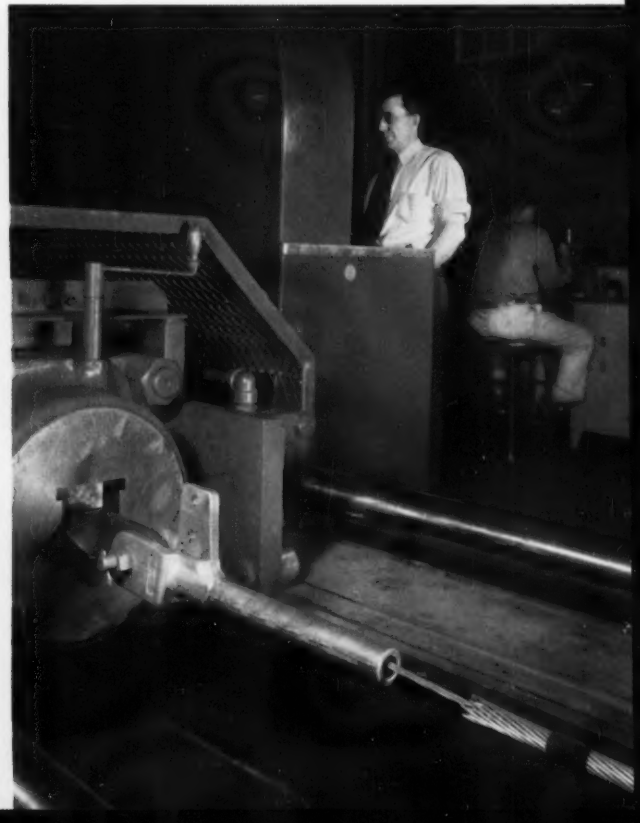
Below right: Testing the holding efficiency of a compression dead-end consisting of steel clevis and aluminum body . . . this accessory must hold at least 95% of the rated strength of the conductor. Note that the steel core has not yet failed.

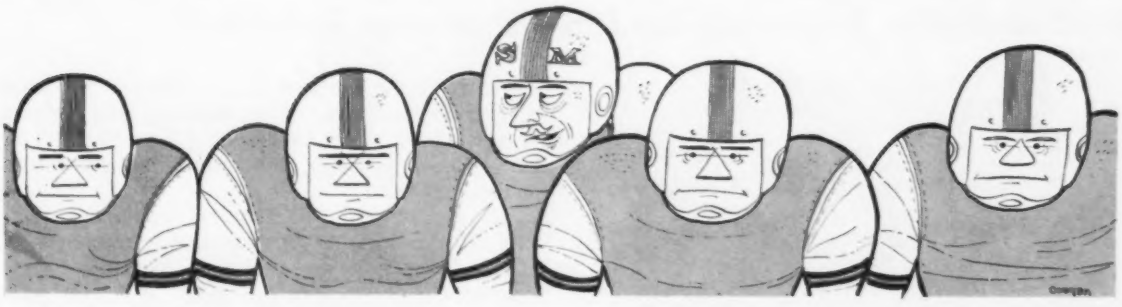
Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM
ELECTRICAL CONDUCTORS AND ACCESSORIES
ALUMINUM COMPANY OF AMERICA

ALCOA THEATRE
Fine Entertainment
Alternate Monday Evenings







The Sales Manager's Place in the Line-Up

GEORGE W. PEAK, Director of Organization Planning, Public Service Co of Indiana

Most electric utility sales work consists of reinforcing the efforts of manufacturers of consumer electrical devices. It is indirect, but it is nevertheless important.

A measure of its importance is the high place accorded the sales management function in utility organization. A study of the organization charts of 86 electric utility companies shows:

- The most usual title for the main sales management executive is vice president.
- He is directly responsible to the chief executive in roughly three out of four companies.
- In none of the companies is there more than one intermediate executive between him and the chief executive.

Internal organization of utility sales departments falls into no recognizable pattern, though many companies have established subordinate units to deal with industrial, residential, and commercial sales, and with farm service.

Among the special subordinate units noted in one or a few companies are those dealing with sales planning, market research analysis, costs and budget coordination, research and statistics, sales applications, display service, personnel & training, rates, dealer and builder promotion, heating sales, air conditioning sales, adequate wiring, street lighting, and municipal relations.

Home service and lighting sales units, although sometimes given separate recognition, are frequently organized as parts of other subordinate units.

In 20 of the 48 companies whose charts show departmental subdivisions, units in the sales department merchandise electrical appliances directly.

Sales departments in a few companies have jurisdiction over commercial offices that make collections and otherwise deal with customers on service matters.

In 11 of the 48 companies sales personnel in the field offices are organized into units under direct jurisdiction of the main sales department. In other companies, the line of authority runs through the general field managers of districts or divisions.

Titles of Main Sales Management Executives

(in 76 electric utility companies)

	Number of Companies*			
	Total	Large	Medium	Small
Vice President	51	11	35	5
Manager	19	1	12	6
Director	4	1	3	0
Other	2	1	0	1

Executives to Whom They Are Responsible

(in 83 electric utility companies)

	Number of Companies*			
	Total	Large	Medium	Small
President	60	9	43	8
Executive Vice President	11	2	7	2
Vice President & General Manager	2	1	0	1
Other Vice Presidents	10	1	7	2

* Companies having over $100 million annual revenue classed as "large"; $25-100 million classed as "medium"; under $25 million classed as "small."

Subordinate Sales Organization Units

(in 48 electric utility companies)

Industrial Sales	30
Residential Sales	22
Farm Service	19
Commercial Sales	15
Commercial and Industrial Sales	9
Residential and Commercial Sales	5
Residential and Farm Service	3

News About People

Jurden Made Anaconda-Jurden Associates President

JURDEN BOSCHEN

Wilbur Jurden has been elected president and chief engineer of Anaconda-Jurden Associates, Inc, a newly formed subsidiary of Anaconda Co. Herman H. Boschen has been made vice president and assistant to the chief engineer.

The new company will take over the former operations of the engineering department of Anaconda.

Jurden's first job was rodman on the Union Pacific Railroad Co at Horsethief Canyon, Wyo. He later became associated with mining camps where he learned his trade. In 1925 he joined Anaconda Co as chief engineer at Anaconda, Mont. He served as a consulting engineer for Phelps Dodge Corp and subsidiaries and Erie Mining Co.

Boschen, who is a native of Brooklyn, N. Y., came to Anaconda's engineering department in 1939. He has been acting as Jurden's principal assistant for many years.

Vance Becomes Northern States Power Secretary

Northern States Power Co has elected Marvyn D. Vance as secretary, succeeding the late John Prentice. R. F. Swanson, who has been manager of shareholders records, succeeds Vance as manager of shareholders service department.

Vance joined the company 35 years ago although he had worked during summer vacations for the two previous years. He began work in the physical stores department and subsequently held various positions in the stores accounting department until 1938 when he was transferred to the special reports department of the general office. He was made manager of the shareholders service department on May 1, 1955.

Swanson began working for the company at Faribault in 1921. He was transferred to Minneapolis as supervisor of the voucher and disbursement sections in 1941.

Preformed Line Products Makes Brown Sales Manager

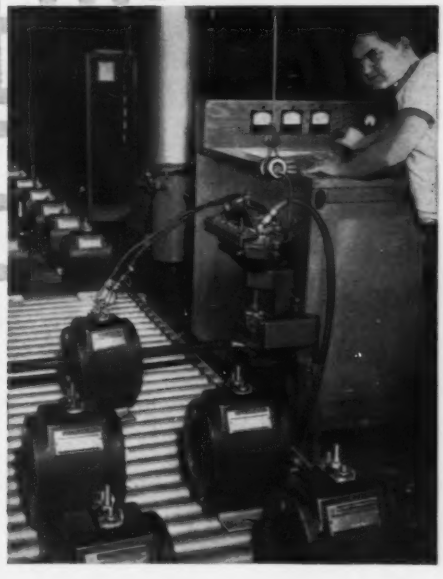
Edmund H. Brown has become general sales manager of the Preformed Line Products Co.

After serving as sales manager at Frank M. Whiting Co and the Wilcox-Crittenden Co, Brown was appointed to the post of eastern district sales manager for Preformed Line Products in 1957.

Early this year, he became assistant general manager of sales. Brown has moved from Connecticut to the main office in Cleveland.

Other appointments were: Philip M. Schloss to treasurer and assistant secretary; Ernest J. Pavlock to controller; Rhynie F. Hollitz to manager of foreign operations; Thomas F. Peterson, Jr, to assistant to president, and Gordon C. Higginbotham to sales promotion supervisor.

ALLIS-CHALMERS



Now Available . . .

18 types of cast epoxy resin instrument transformers

To meet industry's growing demand for these superior quality instrument transformers, Allis-Chalmers has instituted a program of developing a number of new types for various applications — and has more than doubled previous production capacity.

No Maintenance — Easily Installed

Epoxy resin, virtually a miracle material, gives transformers complete protection—both electrical and mechanical—either outdoors or indoors.

Allis-Chalmers epoxy resin transformers:

1. Have excellent dielectric properties.
2. Can withstand wide temperature variations and severe mechanical shocks.
3. Are maintenance free . . . require no painting, resist solvents.
4. Can be installed in any position — quickly, easily.

Your A-C man will give you the complete story, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Types of epoxy resin cast transformers available

Type	INDOOR	OUTDOOR	INSULATION CLASS	CURRENT RATINGS (AMPERES) 10-5	15-5	25-5	40-5	90-5	75-5	100-5	150-5	200-5	300-5	400-5	600-5	800-5	1000-5	1200-5	1500-5	2000-5	3000-5	4000-5
BKM	x	x	600														x	x	x	x	x	x
LM	x		600													x						
MM	x	x	600									x		x								
TWM	x	x	600									x		x	x	x						
BKIM	x		5000															x	x	x	x	x
BKAWIM	x	x	5000															x	x	x	x	x
BKWDIM	x	x	5000															x	x	x	x	x
BKM PLUS KIT	x	x	5000															x	x	x	x	x
LBM 42-KV IMPULSE	x		5000	x	x	x	x	x	x	x	x	x	x	x	x	x						
LDM 42-KV IMPULSE	x		5000	x	x	x	x	x	x	x	x	x	x	x	x	x						
TWM PLUS KIT	x	x	5000									x		x	x	x						
BK2M	x		8700															x	x	x	x	x
BKAW2M	x	x	8700															x	x	x	x	x
BKWD2M	x	x	8700															x	x	x	x	x
BK3M	x		15000															x	x	x	x	x
BKAW3M	x	x	15000															x	x	x	x	x
BKWD3M	x	x	15000															x	x	x	x	x
K3M	x		15000	x	x	x	x	x	x	x	x	x	x	x	x	x						

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ALLIS-CHALMERS

OSTERLE

Osterle: West Penn Research Manager

West Penn Power Co has promoted William H. Osterle from supervisor of planning engineering at the general office to manager of research and development department. Gordon B. Hoffman has been named assistant manager of the planning engineering department.

Osterle came to West Penn in 1925 in the general office. He returned to the general office engineering staff in 1931 after serving four years as a division engineer.

In 1945 he became system planning engineer, and supervisor of planning engineering in 1955.

He is past chairman of system planning committee of Pennsylvania Electric Association, member of the National Society of Professional Engineers, and a registered engineer in Pennsylvania and New York.

Hoffman is a 27-year veteran of West Penn service.

PERSONAL BRIEFS

William M. F. Seymour has been named area development director of New England Electric System, succeeding the late **Lincoln Baylies.**

Thomas S. Nickelson, Jr, and **Charles E. Smith,** production engineers of Detroit Edison Co, have been appointed to the staff which will operate the reactor section of the Enrico Fermi atomic power plant being built by the Power Reactor Development Co.

Virginia Electric & Power Co has named **Philip G. Morrisette** manager at Hopewell, Va.

R. E. Tweeddale has been appointed general manager of the New Brunswick Electric Power Commission. He will continue as chief engineer.

C. Charles Burns has joined the insurance and pensions department of Commonwealth Services, Inc, as a consultant on welfare programs.

V. M. Murray, Seattle area manager, Bonneville Power Administration, has won the highest honors than can be conferred by the Department of Interior, the Distinguished Service Award and gold medal, announced Administrator William A. Pearl.

Robert F. Throne has retired as chief mechanical engineer for Public Service Co of Colorado. Other retirements were: **James H. Curry,** head cashier and **Harold E. Thurman,** supervisor of accounts information.

John M. McGurn has been promoted by Virginia Electric & Power Co to assistant district manager, Richmond district, from assistant superintendent of production.

Arkansas Power & Light Co has promoted **Reeves Ritchie** from assistant to W. H. Overby, Jr, manager of the Central Division, to personnel director, succeeding **Clyde V. Hussey,** deceased. **H. L. Leftwich,** manager of the Stuttgart plant, has taken over Ritchie's former position.

J. B. Gardner has been appointed assistant chief engineer of Kerite Co, succeeding **Ralph B. Norton,** who was named chief engineer earlier in the year.

Sylvania Electric Products Inc has named **L. B. Pleasants** to the newly created post of marketing development manager for lighting sales.

Eric Hoagberg has been appointed manager of the advertising and merchandising department of Kelvinator International, succeeding J. R. Palomo who resigned to establish his own business.

Westinghouse Electric Corp has made these appointments: **V. V. Schlosser** to manager of engineering, atomic equipment department; and **Philip F. Dietz,** assistant to the manager, photo-miniature lamp department.

General Electric Co has made these appointments: **William F. Oswalt** has been named general manager of the direct current motor and generator department at Erie; **Robert F. Johnson,** general manager of the newly formed lamp metals and components department of GE's Lamp Division.

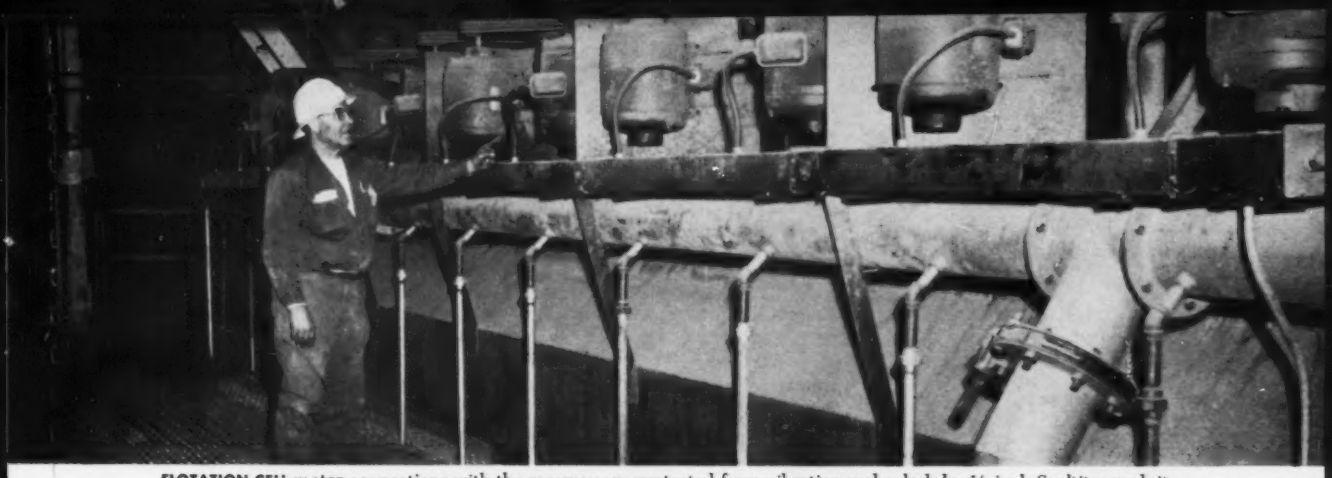
G. W. Jones has been named manager of market research at Riverside-Alloy Metal Division, H. K. Porter Co, Inc.

Edward W. Leiger, vice president and eastern regional manager, American-Standard, American Blower Division, has retired.

OBITUARY

James A. Space, 63, a senior mechanical engineer with Public Service Electric & Gas Co, died on Sept. 14 of a heart attack while playing golf.

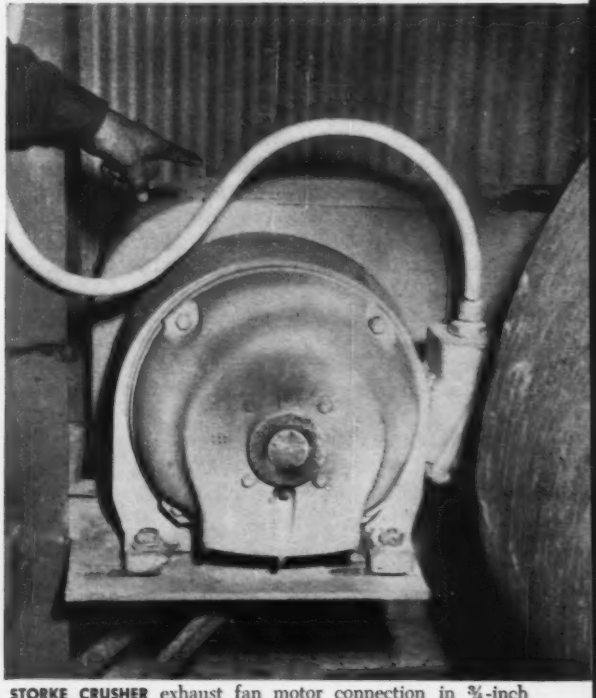
Professor Charles DeVan Fawcett, 70, retired professor in the University of Pennsylvania Moore School of Electrical Engineering, died Aug. 16.



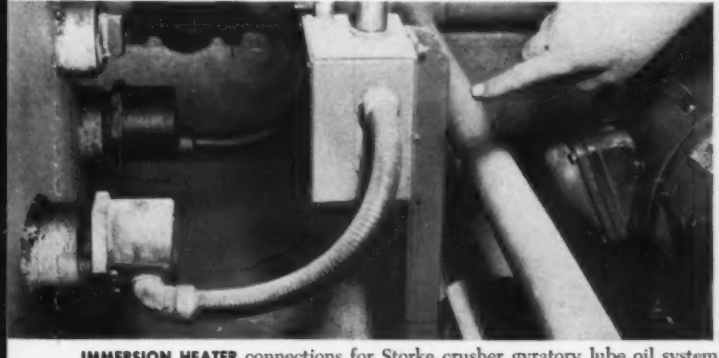
FLOTATION CELL motor connections with the raceway are protected from vibration and splash by ½-inch Sealtite conduit.

CONVEYOR side-travel switch connections are protected from spilling rock by ½-inch Sealtite.

OIL PUMP motor connections to conduit are protected from seeping oil by ½-inch Sealtite.



STORKE CRUSHER exhaust fan motor connection in ¾-inch Sealtite must accommodate motor position shifts.



IMMERSION HEATER connections for Storke crusher gyratory lube oil system are protected from heat and spillage by 1-inch Sealtite.

Nearly a mile of Sealtite flexible, liquid-tight conduit protects wiring for Climax Molybdenum*

In hundreds of vital spots, more than 4000 feet of Sealtite help keep equipment operating dependably at The Climax Molybdenum Company mine, Climax, Colo. The flexible, liquid-tight conduit guards wiring to motors and controls from the full range of underground mining and mineral dressing hazards—from rock fragments to flotation reagents, dust, oil, heat, moisture, vibration, and movement.

Electrical Wholesalers stock Sealtite. Buy it in long, random lengths on nonreturnable wooden reels, at no extra cost. Available in sturdy cartons that are easy to store and carry to the job. Liquid-tight connectors also are available from wholesalers' stocks. For information write: The American Brass Company, American Metal Hose Division, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

**A Division of American Metal Climax, Inc.*

CUTAWAY SECTION of Type U.A. Sealtite shows tough polyvinyl jacket over flexible metal core. Copper conductor wound spirally inside conduit gives positive ground.

insist on the conduit marked **SEALTITE®**

FLEXIBLE, LIQUID-TIGHT CONDUIT

an **ANACONDA®** *product*

Geneva Conference

(*Continued from page* 60)

Russians models of their toruses and linear machine known as "Ogra".

The basic problem facing scientists in countries with major thermonuclear research programs is how to secure the stability of the plasma in which the thermonuclear reaction takes place. Here is obviously a wide field of experiment open to the physicist. The ingenuity of the American mirror machines, in which magnetic "bottles" are designed to have powerful magnetic "corks" at each end, evoked interest. The Russians, with their 60-ft-long Ogra machine in Moscow, have adopted the same principles for reflecting the hot plasma back and forth within the bottle.

The British Zeta, having provided valuable data, is being redesigned, and the Russians had accorded it the honor of making almost an exact copy, called "Alpha".

Dr. Edward Teller, Radiation Laboratory of the University of California, was the American in the fusion sessions who attracted most attention. Dealing with fusion, he said that once an actual controlled thermonuclear reaction had definitely been achieved, the physicists would hand the engineers a "most unenviable job" of providing remote controls, coping with radiation effects on materials, and finding substances that will withstand extremely high temperatures longer than in research.

Sales Assignments

COMPANY STAFFS

Pacific Coast Engineering Co has opened a Southern California Office at 1404 Cravens Ave., Torrance. Ewell O'Bryan is Sales manager for the territory, which includes Southern California and Arizona.

Rome Cable Corp has named Jack F. Guyer sales manager of its Cleveland office.

I-T-E Circuit Breaker Co has named Donald G. Vincent and William R. Toye sales representatives for the Engineering Products Section, Special Products Division. They will handle sales of radar and microwave communications antennas and systems and high-power waveguide used in military and commercial applications.

De Laval Separator Co has announced the appointment of Philip E. Mitchell as an industrial sales engineer. He will service the Cleveland area.

Weston Instruments Division of Daystrom Inc has named John C. Washington manager of the Los Angeles District. He will supervise all sales and district office operations for Weston in southern California and parts of Nevada.

Graybar Electric Co has made these sales appointments: D. E. Clisbee has become general commercial sales manager with headquarters at 420 Lexington Ave, N. Y. L. E. Williamson has been appointed manager at Hammond, Ind. L. A. Peterson has been named new district operating manager in Seattle, Wash., after serving most recently as Graybar manager in Jackson, Miss. The district includes Washington, Oregon, Idaho, and Montana.

Okonite Co has appointed Edward Danielson, Jr, as regional manager of the company's newly-created West Coast region. Included in the new territorial division are the Los Angeles, San Francisco, Portland, and Seattle sales offices.

Electro-Motive Division of General Motors Corp has appointed H. S. Hince as sales promotion manager.

Exide Industrial Division of the Electric Storage Battery Co has named Herbert H. Warren New York branch sales manager, succeeding John W. Weigt who retired on July 31. Warren will be in charge of sales and service of Exide industrial batteries in the New York state, northern New Jersey and western Connecticut areas.

Sylvania Lighting Products, a division of Sylvania Electric Products, Inc, has appointed Raymond W. Corwin to the newly-created post of Middle Atlantic area fluorescent fixtures sales manager.

Pittsburgh Reflector Co has added Jerry F. Lachman to the Philadelphia sales staff. He will handle engineering, sales, and service for the entire line of company's lighting products.

Keasby & Mattison Co has named Robert W. Betts as a product supervisor in the Quality Control Division.

Worthington Corp has appointed Walter A. Penner as district office manager of its Denver district, replacing C. R. Walbridge who has resigned.

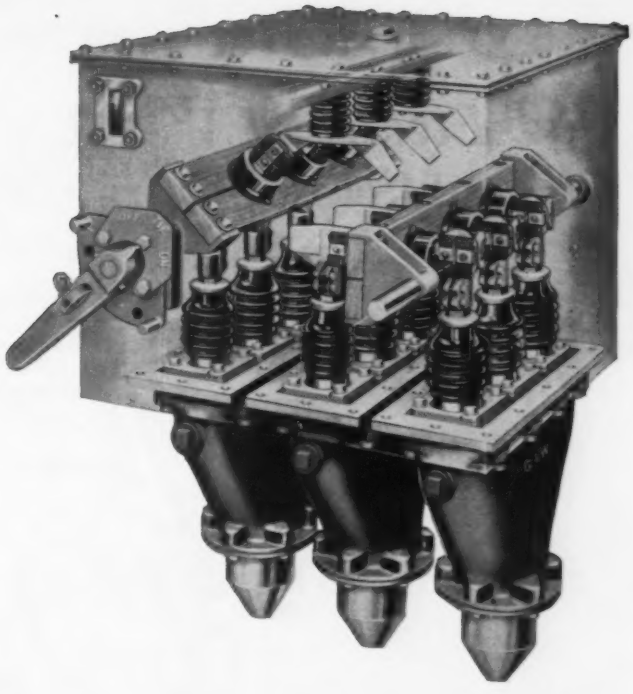
Koppers Co has named Earl L. Wilson, Jr, as manager of the Metal Products Division's eastern district.

REPRESENTATIVES

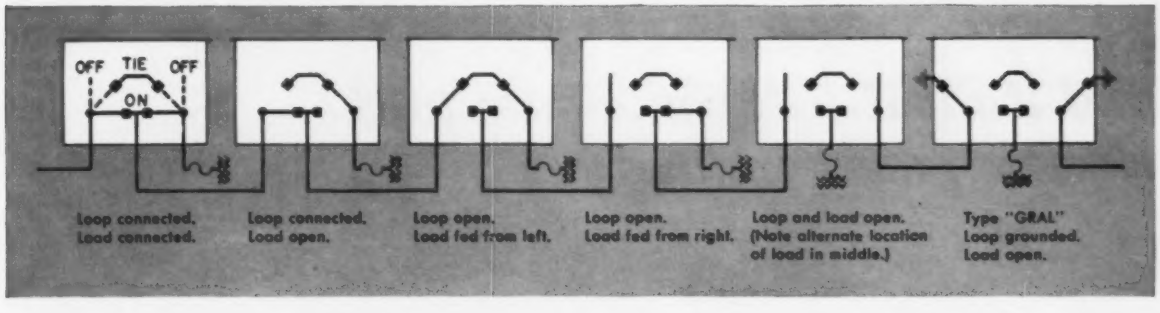
Automatic Switch Co has appointed the following authorized stocking distributors of Asco solenoid valves: Tristate Electrical Supply Co, Inc, Baltimore, Hagerstown, and Cumberland, Md.; John Day Rubber and Supply Co, Omaha; E. Keeler Co, Williamsport, Pa.; Control Equipment Co, Salt Lake City, Utah; Electro-Tech Equipment Co of Atlanta, Atlanta, Ga.; Fitzpatrick Electric Supply Co, Muskegon, Traverse City, and Holland, Mich.; and Martin Electric Co, Dayton, Ohio.

Triangle Conduit & Cable Co, Inc, has appointed Joseph T. Devlin as a Philadelphia sales representative for the Electrical Division. He will represent Triangle in the sales of electrical wire, cable and conduit in western Pennsylvania.

Southern States Equipment Corp recently announced appointment of R. T. Lewis & Co, Denver, as representatives for Colorado, Wyoming, and portions of Montana.



low cost, unexcelled system flexibility


OFF
TIE
OFF
ON
Loop connected. Load connected.
Loop connected. Load open.
Loop open. Load fed from left.
Loop open. Load fed from right.
Loop and load open. (Note alternate location of load in middle.)
Type "GRAL" Loop grounded. Load open.

VOLTAGE CHARACTERISTICS

voltage rating	60 cycle withstand dry	impulse withstand 1½ x 40 wave
7.5kv	36kv	95kv
15.0kv	50kv	110kv
23.0kv	70kv	150kv
34.5kv	95kv	200kv

CURRENT CHARACTERISTICS

ampere rating	switch	amperes	
		momentary	4 seconds
400	standard	20,000	15,000
	special*	30,000	19,000
1000	standard	40,000	35,000
	special*	50,000	40,000

standard contacts silver plated
*silver inlaid contacts

Where maximum flexibility is demanded in a distribution system, the Type RAL oil switch has no equal. A few of the connections made possible with it are shown above.

The RAL load break oil switch is designed for three ways (two feeders and one load). The ways, links and tie buses are so compactly combined that only one RAL switch is needed to do the job of three conventional type switches. Costs are reduced accordingly—for equipment, installation time and space requirements. Maintenance expense is always far less for a quality product, too.

Standard RAL switches are made in 400 ampere (full load break) rated 600 volts, 7.5 kv and 15 kv. Special designs are made for 23 kv and 34.5 kv and for 1,000 amperes.

You can't afford to overlook the opportunity to learn more about this G&W switch. Contact a G&W representative about it today.

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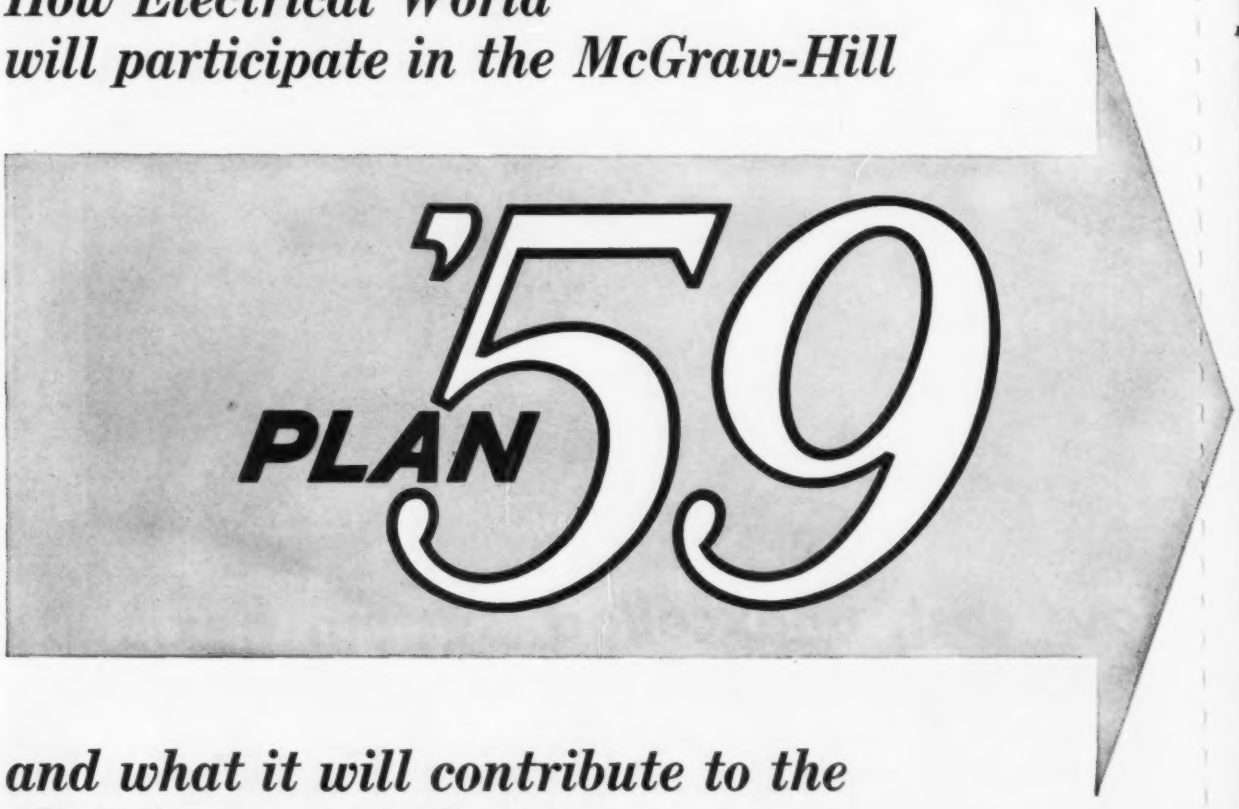
How Electrical World will participate in the McGraw-Hill



and what it will contribute to the electric power industry

During September, October, and November, each of the 34 McGraw-Hill publications will feature one or more "theme issues." This coordinated effort, called Plan '59, will document what needs to be done *now* to assure success in the 1960's for—

- individual companies in the areas these publications serve
- the business community as a whole
- the nation, in its fateful economic competition with the Soviet Union—a challenge the U. S. State Department has characterized as "the most dangerous of all" confronting us.

At the right is a brief message from Fischer Black, Publisher of Electrical World, outlining this publication's approach to Plan '59 through a series of five consecutive issues devoted to "Modernizing Electric Power Systems."

This you can be sure of...

In our world
we can be certain of three things:
Death, taxes, and old age,
and we're all familiar with how fast
this last one creeps up.
But have you ever considered
how rapidly it also overtakes
an electric system.
We've given careful thought
to the subject in recent weeks
and come up with a startling conclusion:
Ten billion dollars' worth
of electric systems' facilities
are obsolete today;
and many design, construction,
operating and maintenance procedures
are likewise out-dated.
This is a big problem,
and one which should be faced *today*—
not tomorrow
when costs will be much higher,
loads much bigger.
Here is what we propose to do about it...

Electrical World
will devote the October issues
to a penetrating evaluation
of obsolescence in the fields of generation,
transmission, distribution, and service.
We believe that,
although the solutions must be individual,
the subject is worthy of careful study by all.
Our searching reports in this area
are now in preparation,
and will be "must" reading
for you, your staff, and your consultants.

Watch for Electrical World's
"Modernization Series,"
to start with the issue of October 6th—
and after reading them,
have a careful, comparative look
around your own system.

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1—Auto blast interrupter switch, type SE-5, with key lock coordinated with transformer secondary breaker.

B. Transformer Section

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C. Outgoing Section

1—Control panel and 10 KVA, single phase, 60 cycle, 2400/240/120 volt transformer for electric heaters and lights.

4—Type AM 4.16-50, 1200 A magneblast air circuit breakers. Control panel contains three (3) current transformers, ammeter, and ammeter selector switch.

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3— 500 KVA W-H 13200-2300/4000Y
3— 500 KVA G-E 22000-2300/4000Y
3— 500 KVA W-H 7200-2400/4160Y
3— 333 KVA G-E 33000-7200
3— 333 KVA Mol 2400-240x480
3— 333 KVA W-H 2400-120x240
3— 333 KVA G-E 2400-240x480
1— 750 KVA G-E 3-Ph. 33000-6900Y tap changing under load equip.
1—1000 KVA W-H 3-Ph. 3300-7200 tap changing under load equip.
1—2000 KVA W-H 3-Ph. 13800-480
1—2000 KVA W-H 3-Ph. ditto (Inerteen)

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QU.	KVA	MFGR	VOLTAGE
4	1667	Mol.	69,000-34,500
3	1500	G.E.	66,000-2400/4160
3	1000	G.E.	66,000-33,000
3	1000	G.E.	66,000-2300/4000
3	667	Kuhl.	66,000-480
3	300	West.	69,000-6900
3	200	West.	44,000-480
1	5000	West.	34,500-13750/6875, 3 Ph.
1	3750	G.E.	34,400-13,800/7960, 3 Ph.
2	3000	Uptegraff	34,750-4160, 3 Ph.
2	3000	Stand.	33,000-4160, 3 Ph.
2	1500	G.E.	34,400-2520, 3 Ph.
3	1000	A.C.	34,650/11,500-2300
3	200	A.C.	34,500-2400/7200/12470Y
1	3000	A.C.	23,380-2500/4350Y, 3 Ph.
2	1500	G.E.	23,000-2400/4800, 3 Ph.
3	100	G.E.	22,000-7200/12470Y
1	7500	A.C.	13,800-2400, 3 Ph.
3	2500	G.E.	13,800-2300, 3 Ph.
3	1667	G.E.	13,800-600
3	667	Kuhl.	13,800-480
1	600	Stand.	13,200-2300, 3 Ph.
1	450	Penna.	13,200-2400, 3 Ph. Askarel
3	333	Uptegraff	13,800—480
1	4500	West.	7200-2400, 3 Ph.
3	333	G.E.	7200/12470-480
3	125	A.C.	6900-2300
3	100	G.E.	4800-120/240
3	333	G.E.	2400/4160-600
3	150	West.	2400-230/115
3	100	G.E.	2300/4000-230/460

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1	250	A.C.	601 A. 2400 V. 3 Ph. STEP
3	96	G.E.	200/400 A. 2400 V. 1 Ph. IND.
6	36	West	150/300 A. 2400 V. 1 Ph. IND.

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Wanted—University graduate Engineer with at least five years experience operation steam electric generating station for responsible position in Maracaibo, Venezuela. Preference will be given Spanish speaking applicant. Salary dependent on qualifications. P-8320 Electrical World.

Electrical Engineer—Degree—Operate Utility Construction Department. Estimate, bid and supervise jobs. Good opportunity with small but growing engineering contracting firm. Location: Middle West. Send complete resume of education and experience. Include snapshot. State salary expected. P-8915, Electrical World.

Wanted—Electrical distribution construction engineer for assignment in Liberia, West Africa. Man with extensive practical experience in overhead line construction and familiar with substations, switchgear and meters, and cable work. Must be capable of training personnel. Reply in detail to P-8929, Electrical World.

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The Meetings Calendar

OCTOBER

Indiana Electric Association—Annual Convention, French Lick-Sheraton Hotel, French Lick, Ind., Oct. 1-3.

Electric Companies Public Information Program — Workshop Conference, Radisson Hotel, Minneapolis, Minn., Oct. 1-3.

International Association of Electrical Leagues—23rd Annual Conference, Shoreham Hotel, Washington, D. C., Oct. 1-3.

Missouri Valley Electric Association—Sales & Rural Conference and Home Service Workshop, President Hotel, Kansas City, Mo., Oct. 1-3.

Pennsylvania Electric Association—Structures and Hydraulics Committee, Hotel Bethlehem, Bethlehem, Pa., Oct. 2-3; System Planning Committee, Skytop Lodge, Skytop, Pa., Oct. 14-15; Prime Movers Committee, Skytop Lodge, Skytop, Pa., Oct. 16-17; Communications Committee, Benjamin Franklin Hotel, Philadelphia, Pa., Oct. 20-21; Systems Operation Committee, Skytop, Pa., Oct. 23-24; Electrical Equipment Committee, Abraham Lincoln Hotel, Reading, Pa., Oct. 30-31.

Inter-Industry Farm Electric Utilization Council—5th Annual National Power Use Conference, Hotel Statler, Buffalo, New York, Oct. 5-7.

• **Interstate Power Club**—Hotel Martinique, New York City, Oct. 6.

Iowa Utilities Association—Management Conference, Hotel Ft. Des Moines, Des Moines, Iowa, Oct. 6-7.

Edison Electric Institute—Prime Movers Committee, Hotel Statler-Hilton, Buffalo, N. Y., Oct. 6-8; Transmission & Distribution Committee, Hotel New York, New York City, Oct. 9-10; Residential Wiring Promotion Committee, New York City, N. Y., Oct. 10; Electric System and Equipment Committee, Hotel Barringer, Charlotte, N. C., Oct. 13-14; 5th Annual Area Development Workshop, Hotel Somerset, Boston, Mass., Oct. 15-16; Area Development Committee, Hotel Somerset, Boston, Mass., Oct. 17; Taxation Accounting Committee, co-sponsored by AGA, Tides Hotel and Bath Club, St. Petersburg, Fla., Oct. 22-24; Home Service Committee, St. Louis, Mo., Oct. 28-29.

Canadian Electrical Manufacturers Association—Annual Meeting, Sheraton Brock Hotel, Niagara Falls, Canada, Oct. 8-10.

• **American Society of Mechanical Engineers**—21st Annual Joint Solid Fuels Conference, co-sponsored by American Institute of Mining, Metallurgical & Petroleum Engineers, Hotel Chamberlin, Old Point Comfort, Va., Oct. 9-10.

• **Engineers' Council for Professional Development**—Annual Meeting, Sheraton-Jefferson Hotel, St. Louis, Mo., Oct. 9-10.

• **American Society of Lubrication Engineers**—Fifth Annual Lubrication Conference, co-sponsored with the Lubrication Division of ASME, Statler-Hilton Hotel, Los Angeles, Calif., Oct. 13-15.

• **American Institute of Electrical Engineers**—10th National Machine Tool Conference, Statler Hilton Hotel, Hartford, Conn., Oct. 13-15; 4th Annual Farm Electrification Conference, Hotel Monteleone, New Orleans, La., Oct. 20-22; Fall General Meeting, Penn Sheraton Hotel, Pittsburgh, Pa., Oct. 27-31.

National Electronics Conference—Hotel Sherman, Chicago, Ill., Oct. 13-15.

Wisconsin Utilities Association—Electric and Gas Operations & Sales Convention, Schroeder Hotel, Milwaukee, Wis., Oct. 15-17.

Oklahoma Utilities Association—Electric Light and Power Division Conference, Eastern District, Western Hills Lodge, Lake Sequoyah, Wagoner, Okla., Oct. 16; Western District, Lawtonian Hotel, Lawton, Oklahoma, Oct. 17; Accounting Section Conference, Burlinggame Hotel, Bartlesville, Okla., Oct. 24.

University of Texas—Eleventh Annual Power Distribution Conference, Austin, Tex., Oct. 20-22.

Southeastern Electric Exchange—Engineering & Operation Section, Hotel Roanoke, Roanoke, Va., Oct. 20-21; Accounting Conference, Roosevelt Hotel, New Orleans, La., Oct. 30-31.

National Society of Professional Engineers—Fall Meeting, St. Francis Hotel, San Francisco, Calif., Oct. 23-25.

Kansas Association of Municipal Utilities—30th Annual Convention, Broadview Hotel, Wichita, Kansas, Oct. 26-28.

• Additions this week.

MORE BIG DATES FOR '58

National Electrical Manufacturers Association—Annual Meeting, Traymore Hotel, Atlantic City, Nov. 10-14.

National Association of Railroad and Utilities Commissioners—Annual Convention, Westward Ho Hotel, Phoenix, Arizona, Nov. 17-20.

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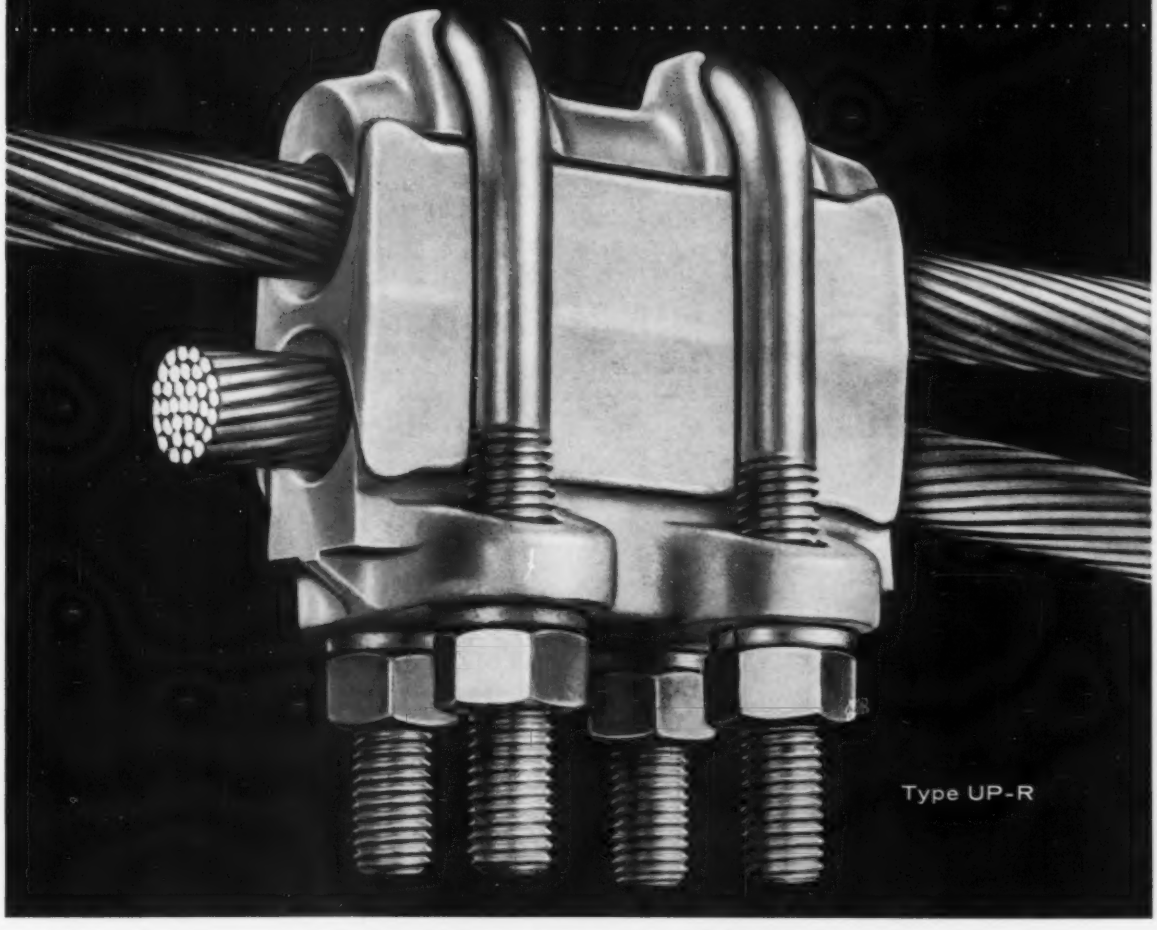

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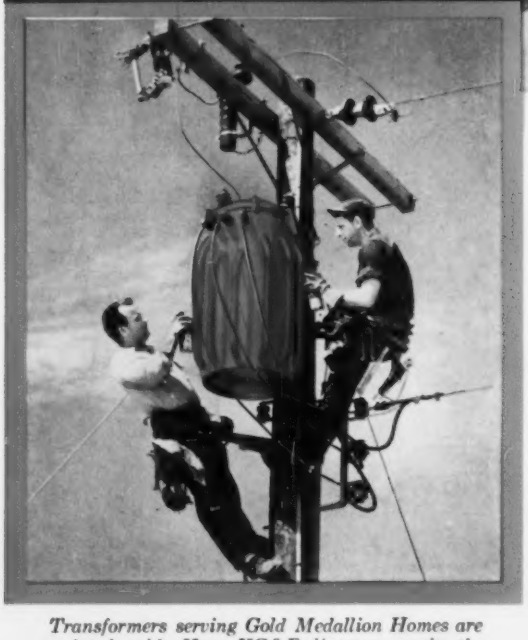

Transformers serving Gold Medallion Homes are painted gold. Here KG&E linemen apply the distinctive color.

President and Chairman of the Board Gordon W. Evans, KG&E, (left) receives the first "Gold Medallion" from Robert Ingmire, manager, Inter-Industry Activities, Live Better Electrically group.

Kansas Gas and Electric's Bronze Award program snowballs into nationwide activity in two years

A wonderful idea, conceived at KG&E in 1956, has literally swept the country. The Bronze Award Home, a one-utility promotion only two years ago, has become the Medallion Home program, with more than 180 utilities cooperating this year in this phase of the Housepower movement.

This program, it is estimated, will account for sales of 1½ billion KWH, approximately $370 million in installed electrical equipment, and will occasion more than $5 million in local advertising and promotion.

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The tremendous and swift adoption of the Bronze Award program proves again the strength of a powerful idea!

"The free interchange of ideas and the cooperation of electric utilities in the development of the Housepower program is one of the strongest guarantees of its continued success," says George Fluehr, president of Kuhlman Electric Company.

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